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CONTRIBUTIONS FROM THE SCHOOL OF PHARMACY OF THE UNIVERSITY OF MICHIGAN.

Communicated by PROF. ALBERT B. PRESCOTT.

IV. *Examination of the Resinoids Podophyllin, Cimicifugin, and Hydrastin. Also the Determination of Berberina by Mayer's Solution.* By L. F. BEACH, Ph.C.

Samples of so-called *Resinoid Podophyllin*, from three manufacturers, were examined with the following results :

	No. 1.	No. 2.	No. 3.
Berberina,[1]	Traces.	None.	Traces.
Residue (of resin) after treating 1 gram with 2 f. oz. acidified water, ...	0·830	0·698	0·840
Portion soluble by treating 1 gram with 10 cc. of water, ...	0·060	0·163	0·099

No inorganic constituents, no starches, and no sugar could be found in any of the samples.

Samples of *Resinoid Cimicifugin* of two manufacturers were examined as follows :

No metallic salts, no starches and no appreciable portion of sugars could be found in either. Both were very nearly all soluble in alcohol. The solubility of each in water and in benzene was ascertained by digesting one gram in a flask with 10 cc. of the solvent, then filtering and washing the residue with 5 cc. more of the same solvent, the total filtrate being evaporated to dryness and its residue weighed :

Dissolved by the water, from No. 1, 0·035 ; from No. 2, 0·092
" " benzene, " " 0·110 ; " " 0·152

No. 1 was examined according to T. E. Conard's directions[2] for

[1] The amount of alkaloid in Nos. 1 and 3 was hardly sufficient for a precipitate of potassium mercuric iodide solution, but gave distinct precipitates with phosphomolybdic acid and a decided reaction with Kluge's test, given in "Proc. Am. Phar. Asso.," 1875, p. 426.

[2] "Am. Jour. Phar." 1871, 151 ; "Proc. Am. Phar. Asso.," 1871, 264.

separating a crystallizable principle from the root of Cimicifuga racemosa, and the crystallized principle obtained from the resinoid. It crystallized in the hexagonal system.

Samples of *Resinoid Hydrastin*, as sent out by six manufacturers, were examined. In each case, one gram of the resinoid was exhausted with boiling water, till the washings gave no turbidity with potassium mercuric iodide. The residue was dried and weighed. The water solution was concentrated, treated with hydrochloric acid, and successive crops of crystals obtained, dried and weighed as berberina hydrochlorate. The mother liquor was saturated with ammonia, and its precipitate obtained as hydrastia. The following *percentages* were found:

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Berberina hydrochlorate, .	35·1	21·9	6·9	28·0	36·0	100·0
Hydrastia, . . .	1·7	17·4	6·7	5·1	6·8	0·0
Insoluble in hot water, . .	25·0	21·1	23·5	29·6	25·2	0·0

In the work on No. 1, trial was made for the third alkaloid found by A. K. Hale in hydrastis root,[1] but none being found, the ammonia was added in excess for the hydrastia. The filtrate from the precipitate of hydrastia still gave a slight precipitate by Mayer's solution, therefore the proportions of hydrastia are all a trifle too low, but suffice for correct comparison.

A Volumetric and a Gravimetric Method for Determination of Berberina by Potassium Mercuric Iodide. The precipitation of berberina by this solution is a close one, but the investigator found no statement of the amount of berberina precipitated by a cc. of Mayer's standard of the solution.

Firstly, it was ascertained that a precipitate of berberina, formed by any excess of the potassium mercuric iodide solution, weighs exactly twice as much as the pure berberina which enters into the precipitate. The precipitate should be dried at about 100° F. One-half the weight of the precipitate equals the berberina. In determining this value, a sample of pure berberina was prepared by extracting a solution of well crystallized hydrochlorate by chloroform in presence of slight excess of potassa, and evaporating the chloroform. Of the pure alkaloid, 0·050 gram was dissolved in acidified water and the solution divided into five equal portions. To these portions were added, respectively, ½ cc., 1 cc., 2 cc., 3 cc. and 4 cc. of Mayer's solution; the

[1] "Am. Jour. Phar." XLIV. (1873), 247; also XLVII. (1875), 481.

mixtures warmed on the water-bath, the nicely settled precipitates gathered and washed on small tared filters and so dried at near 100° F. The weight of precipitate in each case came very near to 0·020 gram. Again, 0·025 gram of the purified alkaloid was taken, and the precipitate found to weigh 0·0495 gram.

Secondly, by noting carefully the number of cc. of Mayer's standard solution[1] required in obtaining the precipitates—then obtaining the weight of the clean, dry precipitates—it was ascertained that 1 cc. of the solution precipitates 0·0425 gram of berberina, weighed as base. The volumetric determination is slow, from the length of time required for the precipitate to settle after each addition of reagent. Traces of precipitate are observed by placing a drop on a blue or black glass slide.

V. *Examination of the "Resinoids," Sanguinarin, Leptandrin and Aconitin.* By J. R. LITTLE, Ph.C.

Firstly, as a means of comparing the samples of different manufactures, and as some indication of their constituents, the following *determinations of solubilities* were made:

SANGUINARIN—0·500 GRAM TAKEN.

	No. 1.	No. 2.	No. 3.
Residue insoluble in 25 cc. *water*, . . .	0·327	0·346	0·357
" " 10 cc. *alcohol*, . .	0·140	0·205	0·294
" " 10 cc. Decinormal *Solution of Potassa*,	0·331	0·312	0·389
" " 10 cc. *Ether*,[2] . . .	0·163	0·345	0·330

LEPTANDRIN—0·500 GRAM TAKEN.

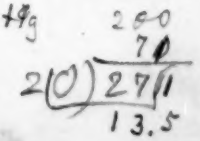
	No. 1.	No. 2.	No. 3.	No. 4.
Residue insoluble in 25 cc. *water*, . .	0·310	0·183	0·190	0·224
" " 10 cc. *alcohol*, .	0·155	0·265	0·094	0·193
" " 10 cc. Decinormal *Solution of Potassa*, .	0·202	0·338	0·078	0·140
" " 10 cc. *Ether*,[2] . .	0·187	0·316	0·217	0·116

By Schiel's method[3] for the extraction of the alkaloid from bloodroot, *sanguinarin* No. 1 was found to contain of *the alkaloid sanguinarina*, 6·2 per cent. By another method *sanguinarin* No. 3 was found

[1] 13·546 grams mercuric chloride, and 49·8 grams potassium iodide, in water to make one litre.

[2] The filtrate was made to measure 10 cc.

[3] "Husemann's Pflanzenstoffe," *S.* 200.



to contain 6·0 per cent. of the alkaloid sanguinarina. The last named method was devised as simpler than Schiel's, and is as follows: 0·500 gram of the resinoid is exhausted with ether, till the washings give no precipitate with phosphomolybdic acid, and the solution fully precipitated by this reagent. The phosphomolybdate precipitate is then digested with solution of potassa, the mixture exhausted with chloroform, and the chloroform solution evaporated—to weigh the residue as alkaloid.

Sanguinarina No. 3 contained *magnesia*. It was of lighter color than Nos. 1 and 2.

Leptandrin, Nos. 1 and 4, each gave marked qualitative evidences of an alkaloid, and No. 2 gave slight results for the same. These evidences consisted of precipitates (in acidulated water solution of the extracted material) by potassium mercuric iodide, phosphomolybdic acid, metatungstic acid and other general precipitants of alkaloids; a brown color with Frœhde's reagent, but no color with sulphuric acid, and with nitric acid a slight yellow color not affected by stannous chloride. Preparatory to these tests for an alkaloid, the "resinoids" were treated with acidulated water, and the filtered solution treated with ammonia and exhausted with chloroform, and the chloroform solution evaporated to a solid.

Leptandrin No. 1 contained traces of a *lead* salt, and No. 2 contained 18 per cent. of *magnesia*. No. 3 was in dark colored vitreous fragments; the others pulverulent and of lighter color.

Two manufactures of resinoid *Aconitin* were examined. No. 1 gave of the *alkaloid* aconitia, by Mayer's volumetric method, 3·34 per cent.; by the gravimetric determination (described below) 4·17 per cent. No. 2 gave, volumetrically, 4·16 p. c., gravimetrically, 4·34 p. c. For these determinations, the resinoids were extracted by acidulated water.

Owing to the imperfect subsidence of the precipitate in Mayer's method, it was sought to find *the gravimetric value of the precipitate of aconitia by potassium mercuric iodide solution*. A sample believed to be pure alkaloid was obtained, and 0·100 gram dissolved, and treated with an excess of the reagent, gave a precipitate, which, when dry, weighed (in three trials very nearly) 0·170 gram. This value was used in obtaining the gravimetric results above stated.

Aconitin No. 1 contained 11 p. c. of magnesium carbonate, and No.

2 gave abundant qualitative tests for the same substance. No. 1 was dark colored, moist and sticky.

VI. *Analysis of eleven specimens of the "Native Sulphide of Antimony," sold in Pharmacy.* By WM. C. SHEFFIELD, Ph.C.

These samples of "black antimony," or "black sulphur," as it is often called, were obtained at as many different retail drug stores, in four cities in Ohio and Michigan. They were subjected to qualitative and quantitative analyses, and the following *percentages obtained:*

	Antimonious sulphide.	Arsenious sulphide.	Carbon, as charcoal.	Silicious matter.	Ferrous sulphide.	Calcium carbonate.	Magnesium, as sulphate.	Total determined.
No. 1 - - - -	31·5	6·6	8 9	17·2	2·5	22·0	7·5	96·2
" 2 - - - - -	0·0	1.2	16·5	73·5	1·5	3·5	1·6	97·8
" 3 - - - -	0·0	trace.	12·5	67·5	4·4	5·5	3·7	93·6
" 4 - - - - -	0·0	4·3	34 7	7·0	6 2	22·0	22·8	96 9
" 5 - - - -	0·0	1·2	55·5	37·5	2·3	1·1	0·9	98·5
" 6 - - - - -	0·0	0.0	11·7	79·3	7·5	0·0	0·0	98·5
" 7 - - - -	0·0	0·0	45·6	9·0	1 1	26·6	13·5	95·8
" 8 - - - - -	0·0	0 0	20·0	77·5	1·1	0·0	0·0	98 6
" 9 - - - -	0·0	0·0	28·4	33 8	4·6	20·9	10·3	98·0
" 10 - - - - -	0.0	0·0	60·6	14·3	1·6	14·2	6·6	97·3
Average - - -	3·1	1·3	29·4	41·6	32·8	11·6	6·7	
No. 11 - - - -	Very nearly pure antimonions sulphide, with a trace of arsenic.							

These results may be of interest to some one curious to know whether *any* dispensing pharmacist ever makes all his antimonial preparations as provided by the "Pharmacopœia." Also, they may be of interest to Mr. Bergh, of New York.

VII. *Valuation of eight samples of Precipitated Sulphur, alias Milk of Sulphur, as found in the Market.* By C. W. L. DIETRICH, Ph.C.

These samples were obtained at different dispensing pharmacies, six in Grand Rapids and two in Ann Arbor, Michigan. They were all

sold as Precipitated Sulphur, *or* Lac Sulphur—the distinction between these terms which the law has enforced in Great Britain not being regarded here.

No. 1 contained 43·6 p. c. of calcium sulphate.
No. 2 " 25·9 " " "
No. 3 was free from calcium sulphate.
No. 4 " " " " "
No. 5 contained 47·7 p. c. of calcium sulphate.
No. 6 " 47·3 " " "
No. 7 " 46·2 " " "
No. 8 " 23·7 " " "

No arsenic, no free sulphuric acid and no other impurity, save a third of a per cent. of silicate in Nos. 3 and 4, was found in any of the samples.

Evidently six of the eight specimens were manufactured by precipitating the lime solution with sulphuric instead of hydrochloric acid (a process having older than centennial authority [1]) and, therefore, represent that useful article (having all the virtues of sulphur in a more eligible form, etc.) which our better regulated British cousins in pharmacy are permitted by their rigorous magistrates to sell as milk of sulphur, but not as precipitated sulphur.

VIII. *Analysis of six nostrums sold as Ague-cures.* By O. L. CHURCHILL, Ph.C.

Five of these articles were found to contain one or more of the cinchona alkaloids (chiefly the cheaper alkaloid); the remaining one contained no alkaloid. None contained arsenic, strychnia, or mercury.

The quantitative determination of the alkaloids, from well known difficulties, is presented as only approximate. The following was the general plan of separation, modified in several particulars as found necessary for each mixture. From a weighed portion of the mixture, the alcohol, if any, was evaporated; the residue diluted with acidified water and filtered (more than once if need be); the filtrate precipitated by a slight excess of caustic soda; in most cases, the precipitate dissolved in acidified water, the solution concentrated and dissolved with strong alcohol, the filtrate evaporated and the residue dissolved with water. Care was taken to avoid loss, by well washing the residues of extraneous matter, and not washing the precipitates of alkaloids at all

[1] "The London Pharmæcopœia" of 1720.

or but slightly. Taking a final precipitate by caustic soda, the alkaloids were then approximately separated from each other by use of ether as a solvent, potassium iodide to precipitate quinidia, potassium sodium tartrate to precipitate cinchonidia, etc.[1]

1. "Ayer's Ague-Cure." Each bottle contains six fluidounces of a dark red syrupy liquid, with a very slight white sediment. Taste, very bitter and slightly peppery, with a slight taste and odor of wintergreen oil. An alcoholic extract (tincture) of cinchona bark, with additional and amorphous cinchona alkaloids (chinoidin), heavily saccharine and slightly aromatized. It contains a resin which presented the physical properties and gave apparently the physiological effects of podophyllum resin, but it was not so far separated from cinchona constituents as to be positively determined. It has free and combined sulphuric acid and the white sediment is calcium sulphate (from the calcium salts of the bark). In *one fluidounce:*

Amorphous alkaloids (Chinoidin),	3·2	grains.
Cinchonia,	3·0	"
Cinchonidia,	0·7	"
Quinia,	0·8	"
Quinidia,	1·0	"
Total,	8·7	"

The cost of a bottle will not exceed 35 cents—the price being at wholesale, 65 cents, and at retail $1.

2. "Wilhoft's Antiperiodic Fever and Ague Cure." The bottle contains four fluidounces of a thin, dark-red liquid, with the odor of cinchona bark, a very bitter and acid taste, and acid reaction. It consists essentially of an infusion of cinchona bark made with water containing aromatic sulphuric acid (like those of the U. S. P.), and probably with an addition of quinia sulphate. One fluidounce contains 3·0 grains of quinia and 5·4 grains of free and combined sulphuric acid (1·5 grains free). Cost of a bottle, not over 25 cents; price, $9 per dozen, $1.50 per bottle.

3. "Christie's Ague Mixture." A bottle contains seven fluidounces of a very dark, syrupy liquid one-fourth filled with sediment, and having a very bitter and peppery taste and an odor of common molasses. The sediment was powdered capsicum and a little resinous

[1] *Flückiger & Hanbury's Pharmacographia*, 327.

matter. The solution consists of a tincture of cinchona bark (the alcohol being 30 per cent. by weight), with cinchonia sulphate, and common molasses. Cost, not over 25 cents per bottle; price, at wholesale, 62 cents; at retail, $1.

4. "Peterman's Michigan Ague Cure." Each bottle contains five fluidounces of a red, syrupy liquid, with much resinous sediment, a very bitter taste, and odor of cinchona. Contains an alcoholic extract of the bark, with chinoidin as the chief medicinal agent, and with a little sulphuric acid and syrup. Cost, complete, not over 25 cents per bottle; price, at wholesale, 60 cents; at retail, $1.

5. "Jayne's Ague Mixture." In each bottle, seven and a half fluidounces of a mixture having an odor and taste of rhubarb, dandelion and common molasses. It contains quinia sulphate and traces of other cinchona alkaloids, but not enough to render the mixture very bitter. The alkaloids were, with some difficulty, separated by benzene in presence of alkali; other means having failed. Cost, about 35 cents; price, at wholesale, 60 cents; at retail, $1.

6. "Rhodes' Fever and Ague Cure, or Antidote to Malaria." In each bottle, twelve fluidounces of a black turbid liquid having a sweet and astringent taste. On standing, the sediment filled one-third of the bottle. The sediment is charcoal. The solution contains a little tincture of chloride of iron, partly reduced to ferrous salt by sugar, which is present; also a trace of sulphuric acid, (a trifle of ferrous sulphate may have been added). Nothing more. "Bottle to be well shaken," etc.; "one tablespoonful three times a day. "Most people could take three times the amount without any uncomfortable feelings." "Persons who find it to bring on unwished-for actions, should place the contents of two or more bottles in an open dish in their sleeping apartments." Price, at retail, $1.

NOTES ON THE GENUS TEUCRIUM.

BY JOHN M. MAISCH.

(*Read at the Pharmaceutical Meeting, held August 15th.*)

In the search for remedial agents, physicians sometimes resort to drugs which have been formerly employed medicinally and have fallen into disuse on account of their indifferent properties, or because other more active and reliable medicines have taken their place; occasion-

ally a remedy is neglected and forgotten, and its valuable qualities have to be, as it were, rediscovered, or it comes to the surface once more, merely, as it seems, for the purpose of proving that we can well get along without it. Such thoughts came to my mind when, a short time ago, a prescription was shown to me calling for *Extractum Teucrii scordii fluidum*, an almost obsolete European remedy in an American form.

Teucrium scordium, Lin., germandreé aquatique of the French, Lachenknoblauch of the Germans, is usually called water germander in English, because it grows in moist, swampy meadows, near ponds, &c. It is found in Western Asia and throughout a large portion of Europe. Forty years ago it was officinal in most "Pharmacopœias" of continental Europe, but since then has been dismissed in the revised editions of nearly all, retaining a place in a few only.

The plant belongs to the natural order of Labiatæ, a family of plants which is characterized by the complete absence of deleterious properties, the active constituents found in them being chiefly volatile oil, associated in many with more or less of a bitter, non-alkaloidal principle, and occasionally with a little tannin. The medical properties of the labiatæ are therefore mainly carminative and stimulant, and frequently tonic and stomachic. They are mostly indigenous to the temperate regions of the old world, the number indigenous to this country being comparatively small; but many species have been introduced here from Europe, and completely naturalized in some sections of the United States.

The genus Teucrium is classed with the tribe *Ajugoideæ*, which has the upper lip short, or deeply notched and turned forward so as to appear wanting, the four ascending stamens projecting through the slit in the upper lip. Several of the European species formerly enjoyed a high reputation, among them the one mentioned, which, together with the allied species *T. scordioides*, Schreb., is regarded to be the *Σχορδιον* of Dioscorides. The plant is softly pubescent, attains a height of 12 to 18 inches, has sessile, oblong, serrate leaves and rose-colored flowers, two or three of which are found in the axils of the leaves. The second species differs mainly by being villous and having cordately ovate, somewhat clasping leaves. Both possess a bitter taste, and, in the fresh state, a distinctly alliaceous odor; it was formerly in repute as an antiseptic and diaphoretic internal remedy for gargles, and as a

dressing for foul ulcers. "The New London Dispensatory," printed in 1676, says of it: "It is Lyptintick, Abstersive, Traumatick, Alexipharmick, Sudorific, Anodyne and Pectoral; it opens Obstructions of all the principal Parts, cleanseth the Intrails and old Ulcers; provokes Urine and the Terms; expectorates rotten Matter out of the Chest; helps old Coughs, Asthmas, Pleurisies, inward Ruptures, Biting and Stinging of Serpents, and potently resists Poison, Plague and all pestilential Diseases. It exhilerates the Heart, cures the Bloody-flux, comforts the Stomach, and drives out the Small Pox and Measles. Outwardly, it cleanseth and heals Wounds and Ulcers, and cures Pains of the Gout. The Essence is most effectual to the Intentions aforesaid."

Similar but more feeble virtues were attributed to *T. Scorodonia*, Lin., s. *Scorodonia heteromalla*, Moench, likewise a European plant, which differs from the former in having petiolate, cordate-ovate leaves, a more distinctly two lipped calyx and yellow corolla.

The fluid extract of water germander may be made by the officinal process for fluid extract of chimaphila, and may be given in doses of one-half to one teaspoonful.

The following European species were formerly employed medicinally for their stimulating and tonic properties, and some still enjoy some popularity as domestic remedies in localities where they occur.

T. Polium, Lin., with sessile linear-lanceolate, crenate and tomentose leaves and terminal white flowers.

T. montanum, Lin. Leaves similar, with a revolute margin and terminal yellowish flowers.

T. creticum, Lin., resembling the preceding, but the blueish flowers axillary and single. The closely allied *T. rosmarinifolium*, Lam., has the branches longer and more slender, and the flowers in cymules of three in the axils of the bracts.

T. flavum, Lin., has its greyish-yellow flowers similarly arranged; but the petiolate leaves are ovate and crenate.

T. fruticans, Lin., is the *Erba di S. Lorenzo* of Southern Italy, and has entire, oblong or oval, sub-coriaceous leaves, and single axillary flowers with blueish corolla.

T. chamaedrys, Lin., the *Χαμαιδρυς* of Dioscorides; leaves short petiolate, ovate to obovate, cuneate at base, crenately serrate; flowers 1 to 3, axillary with purplish-red corollas.

T. botrys, Lin. Leaves triangular-ovate in outline, pinnatified; flowers axillary, in threes; corolla pale red, punctate in the throat.

These and a few other species, indigenous to Southern Europe and the basin of the Mediterranean, most probably do not differ in their medicinal properties from *Teucrium Canadense*, Lin., the wood sage or germander of the United States and Canada.

Somewhat different properties are met with in *T. marum*, Lin., cat thyme, or Syrian herb mastich, which is found in the countries bordering on the Mediterranean. Its leaves are petiolate, ovate or ovate-oblong, rather acute, white tomentose beneath; the rose-red flowers are single in the axils of the bracts, and form a terminal one-sided raceme. It has a strong aromatic, somewhat camphoraceous odor, and an aromatic, bitterish and acrid taste. It has been employed internally, in doses of 20 to 60 grains, in various spasmodic and other nervous disorders, and externally chiefly for its errhine properties; it constituted the active ingredient of the *Pulvis sternutatorius* of some old European "Pharmacopœias," which was composed of sweet marjoram 3 parts, cat thyme, lily of the valley and orris root, of each one part. Cat thyme is prescribed in Europe under the name of *Herba mari veri.*

ON FUCUS VESICULOSUS AND SOME ALLIED SPECIES.

BY JOHN M. MAISCH.

(*Read at the Pharmaceutical Meeting August 15th.*)

Though Theophrastus already, in his history of plants, mentions several species of marine algæ, the sea wrack does not appear to have been employed medicinally before the first half of the eighteenth century; I find, at least, no mention made of it in the new "London Dispensatory" of 1676. Russell seems to have been instrumental in introducing it into medicine through his essay, "De tabe glandulari," which was published in 1750, and in which he specially recommended Fucus vesiculosus in the form of charcoal and jelly, the former, known afterwards under the name of *Æthiops vegetabilis*, being prepared by heating the plant in a crucible closed with a perforated cover until smoke ceased to be given off, while the latter was made by expressing the mucilaginous liquid, and also by macerating the fucus in an equal weight of sea-water for two weeks, or until it was converted into a kind of jelly, which was employed both externally and internally. Upon the

strength of these observations Fucus vesiculosus was admitted into several pharmacopœias, but was afterwards dismissed, the last one dropping it being the "Dublin Pharmacopœia," in the edition of 1850. The beneficial effects in scrofulous swellings and goitre of the vegetable ethiops and of the sponge charcoal, which had been introduced by Arnaud de Villeneuve near the close of the thirteenth century, and the discovery of iodine in the ashes of sea-plants, induced Dr. Coindet, of Geneva, in 1819, to study the effects of iodine, and led to the introduction of this element into medicine. Subsequently, Duchesne Duparc, and after him Godsfrey, stated (1862) that they had found this fucus to possess valuable properties as a remedy for morbid obesity, an observation which, by later investigators, does not appear to be confirmed to the full extent mentioned by the first recommenders in this complaint.

Of late, the bladder wrack, it seems, has been employed medicinally to some extent in the United States, so that a brief description of this and some allied species may be desirable.

The genus Fucus belongs to the suborder Fucoideæ or Melanosporeæ of the natural order Algæ. As originally constituted by Linnæus, it embraced several genera which have been separated by later authors, and among which are the genera Laminaria, Sargassum and Cystoseira, the last-named having the thallus usually inflated into vesicles which often show a moniliform arrangement, while the vesicles of Sargassum are stipitate. Fucus has either a cylindrical (filiform) or flat, usually forking thallus, and the sporocarps inflated and usually terminating the branches. In their fresh state they have an olive or brownish-green color, becoming blackish on drying. Several species have portions of the thallus inflated so as to form hollow vesicles.

Fucus vesiculosus, Lin., attains the length of 1 to 3 feet, and has a flat thallus ½ to 1 inch wide, with the margin entire and a distinct mid-rib running the entire length of the thallus; the vesicles are always in pairs, one being placed on each side of the mid-rib, spherical or oblong globular in shape, and occasionally attaining the size of a hazelnut. It grows on rocky sea shores of the Atlantic Ocean, near high-water mark, and in marshes which are occasionally overflowed by the tide. Formerly it was known by the name of *quercus marina*, or sea oak, its common English names being *bladder wrack*, *sea-wrack*, *sea-ware*, *kelp-ware* and *black tang*. In Scotland and other northern countries it is

used in winter for feeding horses, cattle and sheep, and is eaten by deer when other food is scarce.

F. nodosus, Lin., knobbed sea-wrack, grows in similar localities, but at or near low-water mark. It attains a length of 4 to 6 feet, and has a narrower veinless frond, with the branches almost filiform at the base, the vesicles single in the center of the thallus, or frond, ovate in shape and usually quite large.

F. serratus, Lin., has a veined and serrate frond, and is destitute of vesicles.

F. siliquosus, Lin., s. *Cystoseira siliquosa*, Agardh, has a very narrow frond, 2 to 4 feet long, with short branches, articulated vesicles and lanceolate flattened sporocarps.

F. natans, Lin., s. *Sargassum bacciferum*, Agardh, the gulf-weed of the Atlantic Ocean, is often found in immense masses floating in the sea. Its frond is terete, with the branches linear and serrate and the vesicles globular and aculeate.

All these and many allied species appear to be very similar in their constituents, of which they contain mucilage, mannit, odorous oil, bitter principle and a considerable proportion of saline matter, varying from 14 to 20 per cent., calculated for the dry plants. According to Gödeschen, James and others, the variation is just as great for the bladder wrack as collected in different localities, and it is not impossible that this may be, at least in part, accounted for by having been collected in different seasons, the plant being assumed to be most active when collected after the sporocarps have formed, about the month of July. E. Marchand found (1865) in the ashes of F. vesiculosus 0·719 per cent. iodine and 0·603 per cent. bromine; in F. siliquosus nearly the same amount, and in F. serratus 0·834 iodine and 1·007 bromine, while the ashes of the fucoideæ *Laminaria digitata*, Lamx. contained 5·352 iodine and 0·774 bromine, and *Lam. saccharina*, Lamx. about one-half these amounts (see also "Am. Jour. Phar.," 1854, p. 438).

Bladder wrack has been employed in France in the form of extract, prepared, according to Dannecy, by exhausting the plant with 54 per cent. alcohol; it is stated to represent 15 parts of the fucus ("Proc. Am. Phar. Assoc.," 1863, p. 66); also in the form of syrup, suggested by Potier (Ibid.), by exhausting 150 parts of the powdered plant with 14 per cent. alcohol, evaporating the tincture to 230 parts and dissolving in it 370 parts of sugar; 20 grams (1 tablespoonful) of this

syrup represents 0·6 grm. of the extract and 5 grm. of the fucus, which is the average dose. A fluid extract might doubtless be prepared by a process similar to the officinal one for fluid extract of chimaphila; the average dose of such a preparation would be about a teaspoonful. If, however, the virtues depend mainly upon the iodine and bromine present, the dose would have to be increased very considerably.

THE COMPARATIVE PRICE OF BOUGHT AND SELF-MADE CHEMICALS AND PHARMACEUTICAL PREPARATIONS.

BY G. H. CHAS. KLIE.

Speaking of the preparations of the "Pharmacopœia," one often hears the remark from apothecaries, "It does not pay to make them." Although this is true in regard to a good many, still there is quite a number the manufacture of which by the apothecary repays him amply. The table below comprises 50 chemicals and pharmaceutical preparations, the cost of making which has not been arrived at by mere theoretical calculation, but by practical experiment. The figures of the first column give the wholesale price current in this locality; those of the second column show what each preparation may be made for by the apothecary; the third column gives the difference, and the fourth shows the percentage of gain or loss.

It must be here remarked, that profit or loss cannot in all instances be the same, because the prices of drugs fluctuate, and one party is apt to handle the ingredients more economically than another. The practice of strict economy in manufacturing has an appreciable bearing on the profit:

	Wholesale Price.	Cost of own preparation.	Difference.	Per cent.
	$ cts.	$ cts.	$ cts.	
Acidum phosphoricum dilutum,	lb. 0 30	0 20	0 10	Prof., 33·33
Ammonii bromidium,	" 1 00	0 75	0 25	" 25·00
Antimonii oxidum,	" 1 00	1 15¾	0 15¾	Loss, 15·75
Calcii hypophosphis,	" 3 00	2 63	0 37	Prof., 12·33
Collodium,	" 1 10	0 76½	0 33½	" 30·45
" cantharidale,	" 3 75	1 31½	2 43½	" 64·93
Extractum aloes aquosum,	" 2 00	1 10	0 90	" 45·00
" cannabis indicæ,	oz. 1 14	0 60	0 54	" 47·36
" colocynthidis pulv.,	lb. 5 00	3 75	1 25	" 25·00
" " cp. "	" 3 58	2 80	0 78	" 21·78
" conii alcoholicum,	" 1 93	2 06	0 13	Loss, ·06
" digitalis "	" 2 20	1 36	0 84	Prof., 38·18

	Wholesale Price.	Cost of own preparation.	Difference.	Per cent.
	$ cts.	$ cts.	$ cts.	
Extractum gentianæ,	" 0 75	0 38	0 37	Prof., 49·33
" hyoscyami alcoholicum,	" 3 30	2 59	0 71	" 21·51
" jalapæ,	" 4 50	1 03¾	3 46¼	" 76·94
" nucis vomicæ,	oz. 0 55	0 59	0 04	Loss, ·07
" opii,	" 2 25	0 92½	1 32½	Prof., 58·88
" rhei alcoholicum,	lb. 4 95	2 40	2 55	" 51·51
" belladonnæ fluid.,	" 1 80	0 62	1 18	" 65·55
" cimicifugæ "	" 1 10	0 50	0 60	" 54·54
" digitalis "	" 1 35	0 53	0 82	" 60·74
" ergotæ "	" 3 15	0 98	2 17	" 68·88
" cort. aurantiorum fluid.,	" 0 82½	0 39	0 43½	" 52·72
" ipecacuanhæ "	" 4 13	1 85	2 28	" 55·20
" liquiritiæ "	" 0 82½	0 40	0 42½	" 51·51
" gelsemini "	" 2 05	0 73	1 32	" 64·39
" pruni virginianæ "	" 0 88	0 40	0 48	" 54·54
" rhei "	" 2 30	1 42	0 88	" 38·26
" sarsaparillæ cp. "	" 1 37½	0 72 1-5	0 65 3-10	" 48·21
" sennæ "	" 0 82½	0 36½	0 46	" 55·75
" senegæ "	" 1 93	1 22	0 71	" 36·77
" uvæ ursi "	" 0 82½	0 39	0 43½	" 52·72
Ferri citras,	" 1 45	1 30¼	0 14¾	" 10·17
" et potassii tartras,	" 1 00	0 42¾	0 57¼	" 57·25
" pyrophosphas,	" 1 35	1 09¾	0 25¼	" 18·70
" et quiniæ citras,	" 8 50	5 29	3 21	" 37·14
Hydrargyri iodidum rubrum,	oz. 0 50	0 20	0 30	" 60·00
" " viride,	" 0 45	0 32	0 13	" 28·88
Liquor ferri tersulphatis,	lb. 0 50	0 11½	0 38½	" 77·00
Morphia,	oz. 4 75	4 35 2-5	0 39 3-5	" 0·08
Pilulæ quiniæ sulphatis, s. c. 1 gr.	500 4 00	2 45	1 55	" 38·75
Potassii acetas,	lb. 0 60	0 52	0 08	" 13·33
" bromidum,	" 0 70	0 68⅓	0 01⅔	" 0·02
" iodidum,	" 2 75	2 84	0 09	Loss, 0 03
" tartras,	" 0 60	0 58	0 02	Prof., 0·03
Pyroxylon,	oz. 0 50	0 16	0 34	" 68·00
Quiniæ tannas,	" 2 30	1 27	1 03	" 44·78
" valerianas,	" 6 40	4 65	1 75	" 27·34
Resina jalapæ,	" 0 75	0 41	0 34	" 45·33
Sodii hypophosphis,	lb. 3 00	2 70	0 30	" 10·00

In the cost of own preparation, work has not been calculated. Where, in the fourth column, "Loss" is mentioned, it means so much per cent. cash loss beside the labor.

The average profit, or pay for work, amounts to 37·64 per cent. Of the pharmaceutical preparations alone, the average is 45·82 per cent.; of chemicals alone, 25·36 per cent. The average profit on solid extracts amounts to 36·28 per cent., and on fluid extracts 54·24 per cent., showing that the manufacture of fluid extracts is the most profitable.

N. St. Louis, Mo., July 17, 1876.

ADJUSTABLE SUPPORTS FOR FUNNELS, PERCOLATORS, ETC.

BY E. C. H. HILDEBRAND.

The sides of an equilateral triangle coming as tangents in contact with the periphery of an inclosed circle, mark out in the latter three arcs of equal lengths; further, by drawing a line through the triangle parallel to one of its sides, an equilateral triangle of smaller size is formed, relating to a correspondingly smaller circle. This, in a few words, is the theory applied in the construction of the here described adjustable support or rack for funnels, etc.

An opening of the shape of an equilateral triangle presents a very solid rest for vessels of a conical or spherical form, and the resistibility of the round form against an external pressure, exerted in three symmetrical points on its circumference is very large, even in vessels made of thin material. As it is very desirable to have in the pharmaceutical laboratory a series of supports for funnels, etc., especially now, where the process of repercolation is so much in use, I think this adjustable rack will soon prove the many advantages it possesses over similar arrangements of this kind.

From the illustrations it will be seen that this rack represents a frame consisting of two long pieces of wood—staves of an oblongly square shape—A B and C D, placed in a divergent position to each other and united by cross pieces, 1, 2, 3, etc., a part of which is cut out, leaving an open spoce of 60 degrees (the value of an angle in an equilateral triangle), which, together with the following crosspiece, forms the opening for the reception of the vessel. As gradually by the divergence of the long staves, the successive openings grow larger, they are quali-

FIG. 1.

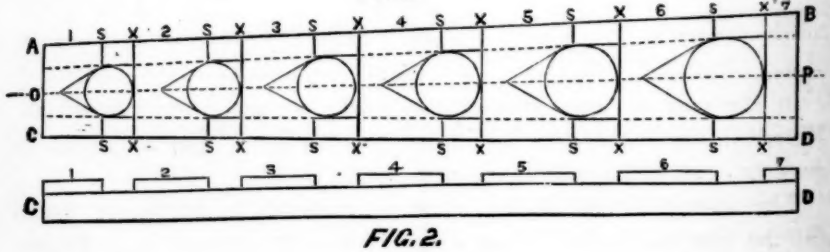


FIG. 2.

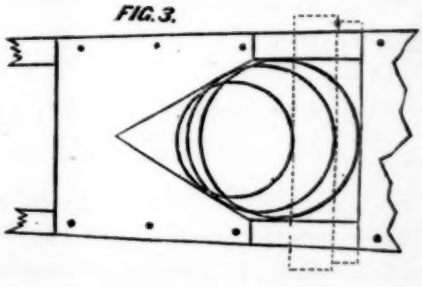
fied to receive larger vessels. Each of these openings is adjustable to vessels of different sizes. To fit a certain opening to a given vessel,

give the triangular space the required size by interposing quadrangular staves between the top pieces, across the rack, as shown in Fig. 3.

In order to enable the reader to construct this rack for himself, I suggest as the shortest way, to make first a drawing of natural size in the style of Fig. 1. Pin several sheets of packing paper on a counter, one in continuance of the other and of the desired length of the rack. Draw A B and C D, and construct a basis for operation line, O P, in the middle between A B and C D. Next, make a pattern of pasteboard or wood, representing an equilateral triangle. This is done by drawing on the material to be used a circle of about 9 inches radius, carrying the latter as a cord around the periphery six times, thus marking out six points, three of which (every second one) are connected by straight lines. The thus formed equilateral triangle is cut out as a pattern, one side of which is divided by a lead pencil mark into two halves. This marked side represents the "base" of the triangle, and the angle opposite may be termed the "point." Lay the pattern on the drawing, point and mark covering line O P. The point standing about two inches from O, draw the angle of crosspiece 1, touching the internal sides of A B and C D. Draw, next, the short lines S S across A B and C D, and the first crosspiece is finished. Take, now, a pair of compasses and describe from line O P the largest possible circle between the inner sides of A B and B D, and inside of angle 1. This done, draw line X X at right angle with O P. Two inches from this line, X, place again the point of the pattern as before, draw the angle of crosspiece 2, then lines S S, the circle of proper size, and so on as described, till all the crosspieces are located as shown in the sketch. The exact size of all the parts as well as their location being now given, it is the carpenter's work to execute the whole arrangement out of wood.

The material is pine wood. The crosspieces are about three-fourths of an inch thick and fastened on A B and C D by means of screws. There are, further, a number of staves to be made as long as the distance of B to D, and from 1 to 2 inches broad, for the interposition between the crosspieces, Fig. 3.

FIG. 3.



The whole arrangement, when finished, is saturated with hot linseed oil and mounted either on four legs or fastened at a distance of about 8 inches to the wall.

To give an illustration, I will mention that the rack in my possession is 13 feet long and has 12 openings for the reception of vessels. The inside width at one end is 10½ inches, at the other 4½ inches. I can insert percolators from 1 pint to 10 gallons capacity. The latter ones (made of the heaviest kind of tinned iron) are frequently charged with 20 pounds of material and the appertaining menstruum, and yet they do not show the least impression from their triangular supports. The packing of the percolators is to be done before putting them into the rack.

Finally, I recommend the adoption of the principle here represented also for the well known iron filtering stands, thereby greatly increasing their usefulness without materially adding to their cost. Large and even the smallest funnels, evaporating dishes, etc., could be equally well placed in or on the same support. Figures 4 and 5 show the de-

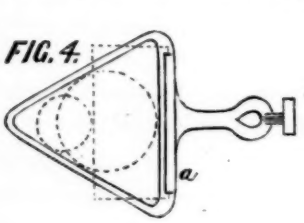


FIG. 4.

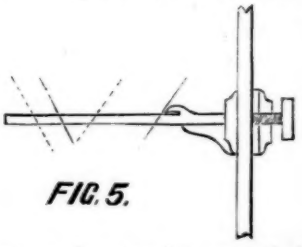


FIG. 5.

tails. The side of the triangle next to the stand is provided with a ridge "*a*" of such a shape as to form with its trestle a longitudinal notch for the reception of those pieces of different widths of thin sheet iron, which are placed across the triangle to adjust the opening to a certain given vessel.

EXTRACTUM GOSSYPII RADICIS FLUIDUM.

BY WALTER A. TAYLOR, PH.G.

(*Abstract from an Inaugural Essay.*)

The supposed emmenagogue effects of the cotton root appear to have been observed among the colored race during their bondage in the South. An old family servant of our family extended me, after an explanation why I wished to know (for she seemed to be rather

superstitious about it), all the knowledge she had concerning the effects of the drug in question; they were in substance as follows: She and those of her fellow-servants that she knew of, were in the habit of gathering the root while the "bole" was either opened or being opened, taking the bark, often the entire root, cutting in fine pieces, and boiling with water for a short time, expressing, and allowing the patient to drink freely of the "tea."

A prominent physician of our city (Atlanta, Ga.) states that, owing to some unpleasant effects following the use of ergot in a case of labor (being an hour-glass contraction of the womb), he was induced to try cotton root; that the cases in which he has employed it are those in which he finds the os uteri sufficiently dilated and relaxed with regular yet ineffectual pains, etc., or, to sum up the whole matter, the presence of every indication of labor, except the expulsive power; and that in these cases he has ever found the cotton root to fulfill every indication. In the latter part of 1870 he employed it in the casess of two mothers of several children, who informed him that they had never passed their previous confinements in less than 36 or 48 hours, but neither one was then in labor more than four hours; that result he can safely attribute to the use of the cotton root; he has also employed it successfully in the sharp, cutting pains which trouble and worry some women several days and sometimes weeks before regular labor sets in. He administers the root in the form of fluid extract or tincture, when he can get a reliable preparation; but so difficult has it been to procure them that he often had to resort to a decoction, which he administered freely.

The fluid extracts made in accordance with the directions laid down in the U. S. P. and those that I have seen from many of the pharmaceutical manufacturers are not stable, and soon become very unsightly, either gelatinizing and completely decolorizing the liquid, or forming a deposit of a peculiar red color, without depriving the liquid entirely of its color. This latter condition seems to be the result of that made from the fresh root.

My first experiments were made with the fresh bark collected in the months of July and August, just six or eight weeks before the picking season commenced. Using stronger alcohol as the menstruum, the liquid passing through had a pale-yellow color, but on standing some time gradually changed into a beautiful red, and after six months has

retained that color, and remained free from any deposit whatever. The preparation made with dilute alcohol underwent the same change of color, but formed a precipitate in the course of three or four weeks. Similar changes were observed in the tinctures prepared with the menstrua named; but an old bark which had been collected about one year yielded with stronger alcohol, at once, a deep-red colored tincture, and the fluid extract prepared from it with this menstruum remained perfectly transparent after three months.

To determine whether the menstruum used had taken up the gelatinous principle, the residue left after making the fluid extract was dried, divided into four equal parts, and treated with mixtures of one part of water, with respectively four, three, two and one measure of strong alcohol; the tinctures were of a light wine-red color, and after three months produced no precipitate. Some of the fluid extract made with strong alcohol was mixed with an equal bulk of water and filtered from the resin; the clear red-colored filtrate soon commenced to separate a precipitate, which rapidly increased. It seems, therefore, as if the gelatinous principle was dissolved by strong and diluted alcohol, but retained in solution by the former.

The gelatinous precipitate from Tilden's fluid extract was found to be partially soluble in solutions of ammonia, potassa and soda, the greenish-red color changing afterwards to red.

From the color changing from a pale yellow to red, in making the fluid extract from the fresh root, and the effect that alkalies have upon it, the probable existence of a chromogene suggests itself. For decolorizing the fluid extract several reducing agents were tried, but it was found impossible to entirely remove the color. Sulphurous acid seemed to be the one that had the best effect upon it, but not sufficiently to admit of further experiment; it is probably best prepared from the fresh root.

The fluid extract is precipitated purplish black by ferric sulphate, and similar by plumbic acetate.

When a little alcohol is added to the solutions of mercuric chloride, silver nitrate, barium chloride and magnesium sulphate, no precipitates are produced.

COUMARIN AND ITS USES.

BY LOUIS VON COTZHAUSEN, PH.G.

(*From an Inaugural Essay.*)

In preparing coumarin from tonka beans, they were grated and exhausted by ether; on evaporating the solvent, crystals of coumarin, rendered impure by fatty matter, were obtained and purified by repeated crystallization from alcohol. Sixteen troyounces of tonka yielded 117 grains of coumarin. This is the process of Boullay and Boutron-Charlard. A somewhat smaller amount was obtained by substituting petroleum-benzin for the ether, and this solvent is recommended as being more economical. Coumarin was obtained in a similar manner also from the dried herbs of Asperula odorata, Lin., Melitolus officinalis, Pers., Liatris odoratissima, Willd, and Galium triflorum, Mich.

The last named herb is frequently collected in this country by Germans under the supposition that it is the *Waldmeister* (Asperula odorata) of Germany, which is extensively used there in making the pleasant *May-wine*, which is prepared by macerating the herb in a cheap quality of Rhine wine and adding sugar and a few drops of orange or lemon juice to suit the taste.[1] Galium, like Asperula, belongs to the order of Rubiaceæ, on drying acquires a fragrant odor, due to coumarin, and contains also an astringent principle, a yellow resin, a fatty, rather unpleasant oil, and grape sugar.

Coumarin is proposed by the author as an ingredient in the following preparations, taking the place of tonka beans and some of the herbs mentioned above:

Extr. New Mown Hay.—Coumarin gr.xii., essence of rose ʒss, cologne spirit ʒii.

Extr. Mille Fleurs.—Coumarin gr.x., oil of cinnamon gtt.ii., oil of rose gtt.iii., oil of neroli gtt.v., oil of lemon gtt.xv., tincture of musk gr.xv., tinct. benzoin gtt.xx., cologne spirit ʒiii.

Extr. Tonquin Musk.—Musk gr.x., cologne spirit ʒiii.; digest, filter and add oil of neroli gtt.i., Coumarin gr.xii., extract of vanilla ʒii.

Fluid Extract of Tonka.—Dissolve tonka ʒviii. with strong alcohol, reserve the first six fluidounces, evaporate the remainder to 2 fluidounces and mix.

[1] Instead of wine, cider is often employed for this purpose, and besides the Asperula, small quantities of the leaves of the black currant, strawberry, melissa, speedwell and ground ivy (Nepeta Glechoma, Benth.) are sometimes added.—[EDITOR.

Sachet Mille Fleurs.—Tonka ℥i., vanilla ʒiii., cinnamon and cloves each ʒiv., rose leaves ℥ii., orris root ℥v., oils of mirbane, lavender and rosegeranium each gtt.x., comminute by grating, cutting or bruising, and mix.

May-Wine Essence.—Coumarin gr.iv., spirit of orange (made with freshly grated orange peel), water, each f℥xii.; dissolve, mix, and if desirable, color with caramel. A few ounces are sufficient to flavor a gallon of Rhine or California wine.

EXAMINATION OF THE RHIZOME OF IRIS VERSICOLOR.

BY CARL H. MARQUARDT, PH.G.

(*Abstract from an Inaugural Essay.*)

Eight troyounces of the rhizome, in moderately fine powder, was exhausted by alcohol, spec. grav. ·835, and the alcohol distilled off. The residue had a very acrid taste, and separated into an upper, dark-brown, perfectly transparent layer, and a lower one of a more yellowish color; the former was soluble in alcohol, petroleum benzin, chloroform and ether; the latter dissolved completely in alcohol, partly in ether, and not in chloroform or benzin. The entire residue was exhausted with ether and the solvent evaporated, leaving a dark-brown oleo-resin, of a slight disagreeable odor and a very acrid, persistent taste. Ammonia water dissolved a small portion of it, but effected no complete separation. Treated with cold solution of potassa, a yellowish-white emulsion was formed, from which an *oily liquid* separated, which was purified by dissolving in ether, and had then a light color and a pleasant, bland taste, which after awhile became acrid.

The potassa solution was carefully neutralized with sulphuric acid, concentrated by evaporation, and treated with ether, which dissolved a brown, *soft resin*, possessing the acrid taste in a very marked degree, and yielding with nitric acid a beautiful purple colored mass, becoming yellow and tough after some hours.

The residue left by treating the alcoholic extract with ether was of a yellow color, had a sweet taste, was soluble in water and alcohol, and by Trommer's test proved to be *glucose*.

The dregs exhausted by alcohol, were extracted with diluted alcohol, spec. grav. ·941; the light yellow tincture was evaporated to a syrupy consistence and set aside for a week, when a sweet, solid mass

remained. Its solution in water was precipitated by subacetate of lead, and after removing the excess of lead by sulphuretted hydrogen, Trommer's test indicated in the filtrate the presence of *glucose*.

The precipitate on being suspended in warm water and treated with sulphuretted hydrogen, yielded, on evaporating the water, a *yellow mass*, having a peculiar, not unpleasant, bitter taste.

The exhausted powder yielded to cold water some *albumen*, separable by heat, and *gummy matter*, precipitated by alcohol, and the solution of which formed a jelly with ferric chloride (aqueous solution? Editor). Hot water dissolved mainly *starch* from the exhausted powder.

On distilling the fresh rhizome with water, an opalescent distillate, of a peculiar odor, was obtained, from which a white *camphoraceous substance* separated, scaly in appearance, of a faint odor, nearly tasteless and soluble in alcohol.

POWDER FOR PRODUCING OZONE.

BY JOHN L. DAVIS.

"In order to produce artificial ozone, Mr. Lender makes use of equal parts of peroxide of manganese, permanganate of potassium and oxalic acid. When this mixture is placed in contact with water, ozone is quickly generated. For a room of medium size, two teaspoonfuls of this powder, placed in a dish and occasionally diluted with water, would be sufficient. The ozone develops itself; it disinfects the surrounding air without producing cough."

The attention of the writer was called to the above article as it appeared in the "Philadelphia Medical and Surgical Journal," under date of May 20th, 1876. For the purpose intended, it is certainly one of the best of the published formulas, but on account of the danger attending its manipulation, should be used with extreme caution. A prescription with these proportions was taken to an apothecary, who inadvertantly used a mortar in mixing it, with the result of an immediate explosion; which would have been attended with disastrous consequences except for the smallness of the quantity employed.

In mixing these ingredients, trituration should not be used at all, but they should be cautiously mixed with a spatula in small quantities; and even then, if they should have been reduced to a *fine* powder they cannot be mixed without danger, as the mixture is liable to explode at the moment of contact.

Apothecaries who are not deficient in knowledge, are sometimes deficient in caution, and articles published in reliable journals are copied and used without hesitation, and the compounder or dispenser is brought into unlooked-for and unexpected difficulties.

The above article is written solely with a view of placing druggists and physicians on their guard in using or dispensing a dangerous compound.

GLEANINGS FROM THE FOREIGN JOURNALS.

BY THE EDITOR.

Phosphide of Zinc, according to Vigier, is sometimes defective, containing oxide of zinc, probably in consequence of having been prepared in contact with air. It should form a very fine powder resembling iron reduced by hydrogen, easily soluble in hydrochloric acid with an abundant disengagement of phosphoretted hydrogen. Vigier and Curie propose the following formulas:

Pills of Phosphide of Zinc.—Phosphide of zinc in fine powder 0·80, liquorice powder 0·30, and gum syrup 0·90 grams; for 100 pills, silvered. Each pill contains theoretically 2 milligrams of phosphorus, or one milligram of active phosphorus. Two to four are usually administered daily, and can be taken without other inconvenience than alliaceous eructations.

Phosphide of Zinc Powder.—Phosphide of zinc in fine powder 0·40, starch powder 5·00 grams. For 50 packets, each of which will contain 1 milligram of active phosphorus.—*Phar. Jour. and Trans.*, *June* 10, from *l'Union Phar.*, XVII, p. 41.

Phosphide of Zinc was first prepared by Marggraf in 1740. Formerly it was made by fusing, in a bath of iron filings, 74 parts of pure zinc, and adding gradually in small pieces 26 parts of dry phosphorus. This process gives good results only in small quantities (10 to 20 grams). A more recent process (probably by Regnault) is to pass vapors of phosphorus, in a current of dry hydrogen over fused zinc. The product is a spongy, gray mass, of metallic appearance, containing rhomboidal crystals, and resembling somewhat reduced iron when powdered. The metallic particles of zinc should be separated. Its spec. grav. is 4·72. When triturated a phosphorous odor is developed. It is permanent at the ordinary temperature, but at a red heat is fusible and volatile, and if in contact with air burns to zinc phosphate. It should be completely

soluble in dilute mineral acids with the evolution of phosphoretted hydrogen. It is given in doses ranging from 0·005 to 0·02 (1-13 to 1-3 grain) three or four times a day. The largest admissible dose appears to be 0·1 gram (1½ grains), or 0·4 gram (6 grains) per day.—*Hager in Phar. Cent. Halle*, No. 27.

The Reduction of Sulphurous Acid to Sulphur by carbon is not as perfect as was formerly supposed. P. W. Hofmann observed that sulphur is readily obtained by passing sulphurous acid gas over calcium sulphide heated to dull redness, the latter compound being oxidized to calcium sulphate (gypsum), from which the sulphide may again be easily prepared by heating it with charcoal. The sulphides of sodium, potassium and barium will answer the same purpose.—*Indust. Ztg.*, 1876, p. 65.

New Reagent for the Detection of Sulphur in Organic Compounds.—H. Vohl recommended for this purpose, in 1863, to heat the compounds with sodium and prove the presence of sodium sulphide by nitroprussid of sodium. This method, which was also recommended by Bunsen in 1866, indicates the presence of sulphur in all its combinations; but the following reagent is now recommended by Vohl as not producing a color reaction with the oxygen compounds of sulphur: A mixture of one measure of distilled water with two measures of glycerin is saturated at the boiling temperature with slaked lime, and afterwards with recently precipitated hydrate of lead, or with elutriated litharge; after cooling, the clear liquid is decanted and preserved in well-stoppered bottles from contact with carbonic acid. The regent is used by heating it to boiling with the organic body, which is thereby colored black, if sulphur not in combination with oxygen is present. Hair, feathers, horn, albumen, albuminous urine, etc., readily indicate the presence of sulphur. The use of lime is preferable to potassa and soda, because the latter darken many organic compounds at the boiling temperature.—*Ber. Deutsch. Chem. Ges.*, 1876, p. 875–877.

Instability of sublimed salicylic acid.—J. Biel observed that sublimed salicylic acid, which was in long silky needles and entirely inodorous, acquired after a week a rose-colored tint which gradually deepened, the characteristic odor of phenol becoming likewise apparent. The presence of the latter could not be demonstrated by chemical reactions, owing to the presence of undecomposed salicylic acid, but the generation of free carbonic acid was easily proven by passing air, deprived of

all traces of this gas, through the bottle containing the salicylic acid, and through titrated baryta water. The author cautions against the use of sublimed salicylic acid, since this mild remedy decomposes spontaneously into the very caustic phenol.—*Phar. Zeitschr. f. Russl.*

Preparation of salicylic cotton wadding.—For this purpose a white wadding completely freed from fat by sodium carbonate is necessary. E. Rennard saturates in a porcelain mortar 10 parts of this wadding with a solution of 2 parts salicylic acid in 15 of alcohol and 35 of water of 25 to 30°C (77 to 86°F.). After the solution has been completely absorbed, and by means of the pistil uniformly distributed through the cotton, the latter is subjected to pressure until 25 parts of the solution are recovered, which may be used for wetting a fresh portion of cotton. If it is desired to avoid expression, only one part of salicylic acid is employed, but the full quantity of liquid mentioned above, which is about the smallest quantity with which a uniform moistening of the cotton can be effected. The wadding is then dried at ordinary temperature, since a higher heat causes a reddish color. Thiersch has recommended the addition of some glycerin, in order to fix the acid more permanently upon the cotton; but Rennard states that the addition of 10 and even 20 per cent. of glycerin will not completely prevent the dusting of the acid on beating the cotton.

The above proportions furnish a wadding impregnated with 10 per cent. of salicylic acid; this strength and a wadding containing 4 per cent. are most generally employed.—*Zeitsch. Oester. Ap. Ver.*

Diospyros fruit, known in Bombay as *timbooree*, is intensely astringent until quite ripe. It is about 1½ inches in diameter and resembles the American persimmon in properties. W. Dymock does not give the name of the species.

Entada pusaetha, local name *gardul*, is a gigantic climbing shrub, bearing legumes three feet long and 4 or 5 inches wide. The seeds, called *pilpatre*, are heart-shaped, 2 inches in diameter, with a shining brown testa, resembling that of the horse chestnut, but 1-16th of an inch in thickness; cotyledons white, taste insipid, turns water milky. It is reputed of being emetic. In Soonda the roasted seeds are eaten.

The galls of Rhus succedanea, called *kakrasinghee*, are generally single, sometimes lobed, of a purse-like form and vary much in size. They come from Northern India, resemble Chinese galls and have a purely astringent taste.—*Phar. Jour. and Trans.*, June 17.

Oil of Orris.—Prof. Flückiger has examined the solid oil which is prepared in Europe from orris-root by distillation. By repeated crystallization from alcohol and treatment with animal charcoal, inodorous crystals were obtained, having the composition ($C_{14}H_{28}O_2$) and properties of myristic acid, while the odorous principle remained in the mother liquor, so that oil of orris must be regarded as myristic acid, impregnated with some volatile oil. The acid does not pre-exist in orris-root, and is probably liberated from a fat by the influence of steam.—*Archiv d. Phar.*, June.

The behavior of castor oil to petroleum benzin was observed by Hager eight years ago, and recently subjected to further experiments. After agitating one volume of castor oil with two of petroleum benzin and setting the mixture aside, it separates after several hours in two layers, the heavier of which occupies 1·6 vol. at 16°C. (60·8°F.) and 1·75 vol. at 10°C. (50°F.), while the upper layer is benzin, containing about 1-30th of castor oil in solution. In the presence of other fixed oils, the behavior is different: if the admixture is small the heavier stratum will be reduced in volume to 1 or 1·2, and to about 0·4 if the admixture amounts to 25 per cent. In the presence of still larger quantities complete solution takes place. The nature of the fixed oil, however, exerts some influence so that the amount of adulteration cannot be estimated from the volume of the heavier stratum. At a temperature of 40°C. (104°F.) separation into three strata takes place.

Pure Benzol, having a boiling point of 80–85°C. (176–185°F.) dissolves castor oil in all proportions.

Alcohol of 90 *per cent.* yields clear mixtures with castor oil in all proportions at 25°C. (77°F.), but from 3 to 5 volumes are required at 15 to 18°C. In the presence of other fixed oils, much larger quantities of alcohol will not yield clear solutions; but with 2 vol. alcohol on standing, separation into three strata takes place, the lowest of which is usually the foreign oil, the second one castor oil containing alcohol, and the upper layer alcohol containing castor oil in solution.

On cooling a warm solution of castor oil in alcohol, three layers are often formed, the lowest containing mainly stearin and the second chiefly olein.—*Ph. Cent. Halle*, No. 7, 8.

Aeterpen (abbreviated from æthyl-terpen) is the name of a new compound, given by V. Meyer and F. V. Spitzer to a body obtained by them in their investigations on the constitution of the terpens, $C_{10}H_{16}$,

which, according to recent investigations, are closely related to cymol, $C_{10}H_{14}$. The authors prepared Pfaundler's monochlor-terpen by reacting upon camphor with pentachloride of phosphorus, according to the equation, $C_{10}H_{16}O+PCl_5=POCl_3+HCl+C_{10}H_{15}Cl$. A solution of the chlorinated terpen and of ethyl iodide in pure benzol was added to sodium kept under benzol and the mixture heated in a water bath, the flask being connected with a reversed condenser. By repeated fractional distillation and cooling the fractions with ice, crystals were obtained, which were further purified by expression and recrystallization from ether, when they constitute pure æterpen, $C_{12}H_{20}$, formed as follows: $C_{10}H_{15}Cl+IC_2H_5+Na_2=NaCl+NaI+C_{10}H_{15}---C_2H_5$. In appearance, and even in odor, the new compound resembles camphor, but has about the consistency of wax; it fuses at 63·5° C. (146·3° F.), boils without decomposition at 153° C. (307·4° F.—uncorrected) and volatilizes readily at ordinary temperature. It is insoluble in water, but very soluble in ether, benzol, etc.

The other products of decomposition have not yet been examined. —*Ber. d. d. Chem. Ges.*, 1876, 877–880.

Extract of Malt with Quinia.—Hager recommends to discard the use of quinia sulphate in this preparation, which thereby acquires a bitter taste. This is avoided if quinia tannate, prepared by Rozsnyay's method ("Amer. Jour. Phar.," 1875, p. 268), is used. One part of the tannate, dissolved in 100 parts of neutral extract of malt, alters neither the taste nor color of the latter, and does not separate any sediment. After diluting it, a slight bitter taste is produced in a day.

For ferrated extract of malt an improvement on the formula of the German "Pharmacopœia" ("Am. Jour. Phar.," 1873, 109) is recommended, whereby the taste is not affected. Three parts of iron saccharate (*ibid.*, p. 161) are rubbed up with seven parts of glycerin and mixed with ninety parts of extract of malt.

Iodinized extract of malt is made by dissolving 0·01 potassium iodide in 100 of malt extract.

Pepsinated Extract of Malt.—Two parts of saccharated pepsin are triturated with five of glycerin and dissolved in ninety-three of the extract. This preparation is probably best made extemporaneously, since the taste is modified after awhile, without, however, becoming disagreeable.

Extract of malt with hops may, perhaps, be made by dissolving one

part of alcoholic extract of hops in 200 parts of malt extract. (Fluid extract of lupulin may be advantageously used.—Editor.)

Syrup of malt is an unstable, unnecessary preparation, made by mixing one part of malt extract with nine of simple syrup.—*Phar. Cent. Halle*, No. 24.

The constituents of ergot of rye, according to Prof. Dragendorff and M. Padwissotzky, are, 1, *scleromucin*, a colloidal substance, containing nitrogen, but giving no albuminoid, alkaloidal or glucosidal reaction, insoluble in 45 per cent. alcohol, and after drying only partially soluble in water ; 2, *sclerotic acid*, soluble in 45 and in boiling 75 per cent. alcohol, colloidal in the pure state, containing nitrogen ; 3, *sclererythrin*, a red coloring matter, soluble in alcohol, ether, chloroform and caustic alkalies (in the latter with a murexid color), but in combination with lime insoluble in water and alcohol, probably a derivative of anthraquinon ; 4, *scleroiodin*, a coloring matter insoluble in alcohol, ether, chloroform and water, soluble in potassa solution, with a splendid violet color ; 5, *sclerocrystallin*, crystallizing in needles, soluble in chloroform, with difficulty in ether, insoluble in water and alcohol, formula probably $C_{10}H_{10}O_4$; 6, *scleroxanthin*, a hydrated compound of the preceding, yellow and crystalline ; 7, another *yellow coloring matter*, amorphous ; 8, brownish *resin ;* 9, *Wenzell's alkaloids* ("Am. Jour. Phar.," 1864, p. 193), probably identical with each other, inactive upon frogs.

The most active of these compounds is sclerotic acid, which has been successfully used by Prof. von Holst in doses of 0·04 to 0·05 grams injected subcutaneously. Sclererythrin and scleroiodin have a slight action upon frogs. *Tanret's ergotinin* is not a chemically distinct compound ; its action upon frogs and the color reaction with sulphuric acid depend upon the presence of sclererythrin.—*Phar. Jour. and Trans.*, June 17.

Ergotin.—The researches of Professor Salkowski and other German chemists on the active principle in the preparation of ergotin were recently referred to. Professor Buchheim now writes to the *Klinische Wochenschrift* confessing that he also has not succeeded in isolating completely that principle, though he worked on it for several months ; and he states his reasons why he thinks that such isolation might be impossible, and that for practical medical purposes the infusion of ergot, or the freshly prepared extract, will alone remain available.

The organization of the ergot fungus seems to him so low that its mycelium cannot build up organic matter, so as to constitute an alkaloid or glucoside substance from water, carbonic acid and ammonia, but feeds, so to speak, more directly on the vegetable material of the mother plant. He believes that less elementary compounds are taken up by it from the rye grain, and thinks the gluten the most likely material from which to form the gelatin-like substance which he isolated partly from ergotin. On this modified albuminous constituent of the rye, at a certain stage of its metamorphosis, he infers, depends the peculiar action of the fresh infusion or extract. Any further complex chemical processes and reactions for the isolation of the active substance must necessarily have changed it so much in its natural course of decomposition that it has lost its efficacy, in the same manner, for instance, as the decomposing albuminous substances of putrid blood lose their poisonous effects when decomposition has reached to a certain point.

The freshly prepared ergotin seems therefore to give alone a guarantee of success. For subcutaneous application it ought to be carefully neutralized by carbonate of soda, as it contains much acid, especially lactic acid, as Buchheim found, besides quantities of leucin. —*Phar. Jour. and Trans.*, July 1st.

Remedy for Dandruff.—A French physician recommends to apply a solution of chloral hydrate containing 5 per cent. of the latter, by rubbing from ½ to 1 oz. into the scalp by means of a sponge, and repeating it every morning. A slight burning sensation and reddening of the scalp occurs, disappearing after two minutes. If the hair had fallen off in consequence of the dandruff, it will be renewed in about a month.—*Apoth. Ztg.*, No. 25.

Fluid Extract of Chestnut Leaves made from the European variety of Castanea vesca, appears to be gaining favor in Germany as a remedy for whooping cough. In "Phar. Zeitung," of July 26, Dr. Schmidt, of Edenkoben, publishes a long list of German towns and cities where it has been employed, also extracts from numerous letters from physicians and pharmacists, according to which the preparation, though not a specific against the disease mentioned, is regarded as a very valuable medicine, usually relieving in a short time the spasmodic and paroxysmal cough and correcting the expectoration; it has also been found advantageous in the diarrhœa of children.

A New Acid in Mare's Milk has been discovered by Dr. Duval, which is not found in the milk of ruminants, at least not in appreciable quantity. It crystallizes in scale-like needles, is not volatile without decomposition, has a pungent odor and a peculiar taste. It is combined in the milk with a volatile base which evaporates on being heated. It has been named *equinic acid.*—*Chem. Centralbl.*

Preparation of Pure Grape Sugar.—For this purpose C. Neubauer recommends the process of Schwarz (1872). 500 to 600 cc. of 80 per cent. alcohol are mixed with 30 to 40 cc. of fuming muriatic acid, and powdered cane sugar, is dissolved in this mixture to saturation. Large quantities of grape sugar crystallize on standing in wart-like masses, which merely require washing with alcohol and recrystallization from boiling absolute alcohol. The acid mother liquor may be again saturated with cane sugar and used as before.—*Zeitschr. Anal. Chem.*

Impure Persian Opium.—Barnard Proctor recently analyzed a sample of Persian opium from which he obtained only 0·25 per cent. of morphia.—*Phar. Jour. and Trans.*, June 24.

On the Action of Sulphuretted Hydrogen upon Alkaloids.—E. Schmidt observed (1875) that an alcoholic solution of *strychnia*, after saturation with H_2S and exposure to the air separates orange-red crystals, which were found to be $2C_{21}H_{22}N_2O_2$, $3H_2S_2$, and from which mineral acids separated a heavy oily body (most likely H_2S_2) evolving H_2S_2 in a few days.

Under the same circumstances *brucia* yields yellow needles, having the composition $C_{23}H_{26}N_2O_4,H_2S_2$, and by a slight modification, ruby red crystals containing an additional molecule of H_2S_2.

Quinia, cinchonia, cinchonidia, quinidia, morphia, codeia, papaverina, narcotia, thebaina, atropia, veratria, conia and nicotia acquire under similar circumstances an intense yellow coloration; but well characterized compounds have as yet not been obtained. Coffeina and theobromina appear not to be affected by this treatment.—*Archiv d. Phar.*, June, 478–496.

NOTE ON SO-CALLED WOOD OIL.

BY PROF. F. A. FLÜCKIGER.

In a note communicated to the "Archiv der Pharmacie," for May, the author states that he has found that the etherial oil of Dipterocarpus balsam, known as Gurgun balsam or wood oil, when dissolved in

about 20 parts carbon bisulphide, and a drop of a cooled mixture of equal parts of sulphuric and nitric acids added, takes a splendid violet color. A single drop of the etherial oil is sufficient to produce the reaction, and the color lasts several hours. It is not prevented by the presence of resin or by copaiva balsam, so that the reaction takes place with the crude Gurgun balsam, or even when that is mixed with eight times its volume of copaiva balsam. The reaction can, therefore, be used to detect the presence of Gurgun balsam in copaiva balsam. Under the same conditions fish liver and oil of valerian are also colored a beautiful violet, but only transiently so. In order to exclude fish oil from the test, it is recommended to distil off the etherial oil, although on account of its high boiling point (250° to 260° C.) this is not an agreeable task. Only a few drops are required, however, for the test.

Should a wood oil not correspond to this reaction, the author thinks it might probably be due to the fact that some Dipterocarpus trees yield a varying balsam. The balsam is obtained in large quantities from the following species: *Dipterocarpus turbinatus*, Gaertn. (syn. D. lævis, *Ham.*, D. indicus, *Bedd.*), *D. incanus*, Roxb., *D. zeylanicus*, Thw., *D. trinervis*, Blume, *D. littoralis*, Bl., *D. alatus*, Roxb., *D. hispidus*, Thw., *D. gracilis*, Bl., *D. retusus*, Bl. All these species occur in India and in the Archipelago, and the last even in the Philippines. Their resinous juice is used very generally as varnish, hence the name "wood oil." It is hardly probable that they all yield a resin chemically and physically identical. The author has found that the oil distilled by him from undoubtedly true Dipterocarpus balsam is dextrogyre, whilst Werner, who first examined Gurgun balsam, in 1862, speaks of it as lævogyre. In all the specimens examined by the author to the present time, however, he has found the color reaction constant.

Another possible ground for failure in obtaining the reaction is its confusion with other liquids used for similar purposes. The balsam obtained from *Hardwickia pinnata*, Roxb., a leguminaceous plant, is used in Southern India in the same medical cases as copaiva balsam; but an authentic specimen in the author's possession is not fluorescent like Dipterocarpus balsam, and dissolved in carbon bisulphide gives only a yellow color with the acid mixture. The author does not know, however, that it is ever there called "wood oil."

A fat oil, used in enormous quantities in Eastern Asia for paint and varnish, and also as a drastic medicine, and very generally called "wood

oil," is obtained from the seeds of *Aleurites cordata*, Muller (syn. Dryandra cordata, *Thunb.*, Elaeococca Vernicia, *Sprgl.*, E. verrucosa, *A. Juss.*), a euphorbiaceous tree. The tree is common in China and Japan, of very characteristic appearance, and is known in China as the "tung tree." The oils from the seeds of *Ricinus* and *Croton Tiglium* differ in chemical properties and physiological action from most known oils; how far such peculiarities occur principally in the Euphorbiaceæ is a question that yet requires answering.

That the "wood oil" from the Tung tree is a fat worthy of notice is shown by the experiments of Cloez. This chemist obtained from the seeds of *Aleurites cordata*, by means of carbon bisulphide, 41 per cent. of a fixed oil, forming a solid crystalline mass below 32°C. When on the contrary the seeds were treated with ether an oil was obtained that did not solidify even at 18° C. But what is most surprising is that when prepared either by pressure or by one of the solvents mentioned, and heated in the air to 200° C., it changes suddenly into a solid transparent jelly, which is no longer soluble in ether or carbon bisulphide.[1] This change takes place also after a few days, when excluded from the air, under the influence of light alone. The oil dries more rapidly than linseed oil. The principal acid in it was obtained in crystals that melted at 44°, but very rapidly resinified, and therefore did not consist of linoleic acid.

In many respects this Chinese wood oil recalls the singular "axin" or "age" of Mexico, examined by Hoppe-Seyler, in 1860.[2] The Nin fat of Yucatan, described by Dondé,[3] might also be mentioned here. All these oils appear to correspond in yielding a peculiar body, which Mulder describes as linoxyn.—*Pharm. Jour. and Trans.*, July 1, 1876.

NOTES ON THE INTERNATIONAL EXPOSITION.

BY THE EDITOR.

IV.

Among the most important staple articles in the line of crude drugs is *opium*, which is very well represented at the Exposition in its various commercial varieties, as well as in some samples showing the result of the experimental culture of the poppy.

[1] "Comptes Rendus," Sept. 1875, p. 469, and 1876, p. 501.

[2] Gmelin, vol. vii., p. 1471.

[3] "Pharm. Journ.," [3], iv., 836.

The species of poppy cultivated for the production of opium is Papaver somniferum, *Lin.*, of which there are a number of races, the most important of which are the varieties *rigrum* (*glabrum*, Boissier) and *album*. The former of these has usually deep-purple colored petals, varying, however, to almost completely white, and bears seeds which, though usually blackish-blue, vary likewise in shade to a pale yellow. The second variety has the flowers and seeds almost always white, or nearly so. But the most distinctive character between the two varieties is the capsule, which in the black poppy is always subglobular and occasionally depressed or at the base even concave; the capsule opens by pores, which are of the same number as the rays of the closely sessile stigma. The capsule of the white poppy is ovate-globose to oblong and indehiscent..

The collection of the opium takes place after the falling of the petals and before the ripening of the seeds. The capsules are then scarified by means of a one- or several-bladed knife, arranged in such a manner that it cannot penetrate through the capsular wall, which would occasion the loss of the milk juice. The incisions are made either longitudinally or transversely, and the exuding juice is scraped from the capsule on the following morning, by which time it has become sufficiently firm and its color has changed from white to brown. Afterwards it is worked up into cakes, which, in the different countries vary not only in consistence but likewise in shape, size and the material in which they are packed for the market, or which is employed to guard against the cakes adhering together.

The variety of opium which is found in the commerce of the United States is obtained from Turkey, and usually called Smyrna or Turkey opium; it is produced from the black variety of poppy, the incisions being made transversely, or rather somewhat spirally; the collected juice is mixed and formed into globular cakes, each of which is wrapped into one or sometimes two poppy leaves, and when sufficiently dry, is packed at first into bags and subsequently, for exportation, into boxes, a sufficient quantity of chaff, consisting of the calyx of a species of Rumex, intermixed with the triangular fruit being added to prevent the cakes from running together. The Ottoman government exhibits 12 cakes of opium, varying in weight from a few ounces to over a pound, which represent the style in which this drug is prepared in different localities. Larger samples of Turkey opium, both from Asia Minor and the European provinces, are shown, in large, handsome bottles, by H. A. Holstein, Constantinople, and represent the towns and districts of Angora, Beibasar, Geiwe, Konia, Mualitsch, Kiutahia, Saloniki, Seardo, Siwrihissar and Tauchanly.

The opium exhibited by the National Museum of Egypt resembles the former; the cakes shown vary in size, are rather flattened and show the remnants of the poppy leaves in which they have been enveloped; but fragments of Rumex chaff are not observed. The cultivation of opium in Egypt, which was carried on quite extensively about 50 years ago, was subsequently much neglected, but through the experiments and exertions of Gastinel Bey, director of the botanical garden at Cairo, has during the last decade considerably increased, the quantity raised being, however, still insufficient for home consumption, although Egyptian opium may be found in the European market. It is very rarely imported into this country. The capsules exhibited vary somewhat in shape, one lot being depressed globose in shape,

while another is ovate, all having white seeds. The incisions appear to be mostly made with a single knife blade; they are horizontal or somewhat spiral, several being made on different parts of the fruit.

A variety of opium which has become of considerable importance of late years is that produced in Persia, which country is not directly represented at this Exposition; but various samples of its opium are shown by Rosengarten & Sons and Powers & Weightman. The former firm exhibit Persian opium in balls, each one wrapped separately in thin white paper; the latter firm show a large quantity of it in the form of globular cakes, the original shape being considerably modified by mutual pressure, all packed in so-called poppy trash. This opium is said to be principally derived from the white poppy by longitudinal incisions; in collecting the hardened juice, the scraper is occasionally dipped into oil to prevent the opium from adhering; some of the oil becomes mixed with the juice, and the opium has, therefore, a greasy appearance, the oil often exuding in drops when a cake is cut. Persian opium is also formed into short cones and into cylindrical sticks, which are wrapped in paper. It is much more variable in morphia strength and in the amount of matter soluble in water, than Smyrna opium, and this is due, partly at least, to the various admixtures, purposely made for the purpose of moulding it into a peculiar shape, or of obtaining certain preparations in which forms it is popularly employed in that country. It is not met with in this country in the open market, its importation being permitted only with the view of employing it in the manufacture of morphia and the other alkaloids.

East India opium is represented only by two specimens from the India museum, consisting of a broken round cake of Behar opium, and of a ball of so-called "provision opium," which is prepared for exportation to China; the two represent the principal kinds manufactured under the strict supervision of the Indian government. The white poppy is cultivated in India, the capsules exhibited being globular ovate, and bearing the marks of vertical incisions with a three or four-bladed knife. The petals are carefully collected after they have become sufficiently matured to be readily removed together by slight pulling, and the capsules are scarified vertically with a several-bladed knife, called *nushtur*. The petals are carefully preserved and assorted, and afterwards serve for the formation of the covering of provision opium, which is effected by forming *leaves* from the petals in a shallow earthen dish, sufficiently heated to render them glutinous, and afterwards agglutinating these leaves, so as to form a shell about $\frac{3}{8}$ inch thick, in a hemispherical brass mould, by means of *lewah*, which is a kind of paste made by diffusing opium in the *washings* or *dhol* (water which had been previously used for cleaning the opium vessels), and, in order to render it more glutinous, adding a certain portion of *pussewah* or *passewa* (drainings from the recently collected poppy juice). When the opium has attained the standard quality of 70°, *i. e.*, contains 70 per cent. of dry opium and 30 per cent. of moisture, 1 seers 7·5 chittaks (3 lbs.) are weighed out, carefully placed into the shell and formed into a ball, the upper half of which is covered by the ends of the shell, strengthened with some leaves and agglutinated by lewah, after which the *cakes* are rolled in *poppytrash* (the dried plant ground). The finished ball weighs, fresh, a little over 2 seers 1 chitt. (not quite 4¼ lbs.), and when dry 2 seers, or about 4 lbs. avoirdupois. The drying requires much care, to prevent the opium from

spoiling, and the cakes are finally packed in boxes divided into 40 compartments, each of which receives one ball, in which state it is exported, principally to China. The opium used in the East Indies is prepared differently, the juice being evaporated in the sun, when it is formed into square or round cakes; the Behar opium on exhibition is of this kind.

Although the cultivation of the poppy for opium has been repeatedly prohibited in China ("Amer. Jour. Phar.," 1869, p. 477), and the prohibitory decree has never been repealed, it appears to have steadily increased, being carried on under the eyes, if not with the full knowledge of the authorities. There are two varieties of Chinese opium, coming from two ports. The sample which represents the opium met with at the northern port of Newchwang, is a cake of about the size of a fist, somewhat flattish globular in shape, rather firm in consistence, light-brown in color, and of a good opium odor. The cake is wrapped in thin, white paper and is greasy, perhaps rather less than the Persian opium which it closely resembles. It has the appearance of being dried without the aid of artificial heat.

The second variety comes from the port of Hankow, and consists of pieces of a larger cake, which apparently was originally nearly spherical, or perhaps, cylindrical, is wrapped in white paper, and shows on the outside remnants of vegetable tissue, but no impressions or remnants of leafvenation; there can be no doubt of its being identical with the Hankow opium described by Dr. R. A. Jamieson a few years ago (see "Pharmacographia," p. 51). It is firm externally, and of a dirty, yellowish color from the adhering tissue, internally of a deep black-brown, quite soft, and of a good opium odor. Having an extract-like appearance, it is not unlikely that heat is employed in evaporating the milk juice, but no empyrematic odor is observable.

The poppy cultivated in China is not exhibited, but it is not too much to assume that it is the same variety which is employed in India and also in Japan, namely the white, and that the capsule is incised longitudinally. Chinese opium is reported to be inferior to the Indian; but we are not aware of any comparative assays.

Japan has also sent opium as the produce of her soil. The scarified poppy capsules, which are likewise on exhibition, show that the white poppy is here cultivated for this purpose; they differ from the white capsules as ordinarily seen in being narrow oblong in shape. Several incisions are made vertically, and the opium, which is in thin, flattened cakes wrapped in paper, is of a dark-brown color, but of good quality as far as odor and taste are concerned. We could get no information regarding the extent of cultivation, nor do we know of a morphiometric assay of this product.

With the above, the varieties of opium, which are important either for home consumption or in a commercial aspect, have been all enumerated; but several samples are likewise on exhibition which prove that a good medicinal opium can be obtained also in other countries. The sample of opium which was raised in Victoria and sent by Mr. Joseph Bosisto, was unfortunately lost on the voyage; according to his statement, it contained 10 per cent. of morphia, a sample of which, made from the former, has reached here. The poppy capsules have likewise been lost, so that we have no information as to the variety cultivated or the manner in which the capsule was treated.

L. Menchers has on exhibition in the Spanish department several flat cakes of opium wrapped in poppy leaves, and to all appaarance of good quality. The opium shown by Fr. Jobst, of Stuttgart, is of good and even excellent quality—the sample produced in Silesia containing 8 to 9 per cent. of morphia, while that raised in Wurttemberg is marked to contain between 12 and 15 per cent. of that alkaloid. The collective exhibit of the Central Pacific Railroad contains specimens of the white-seeded poppy; it is known that a good quality of opium may be produced in California ("Amer. Jour. Phar.," 1874, p. 105), but there has been but little attention paid to it as yet.

As might have been expected, the exhibition of the various constituents of opium which are used in medicine is quite extensive, though the samples are, in the majority of cases, small and insignificant, and in no way indicating the importance of the articles for the respective countries. Naturally the United States are well represented, and we are pleased to say that the goods are creditable not only in regard to quantity but also to quality. The American exhibitors have confined themselves almost altogether to the commercial medicinal chemicals; hence we find here besides *meconin* merely the alkaloids *morphia*, *codeia* and *narcotina* in their uncombined state, and particularly the first one in several of its saline combinations, among which the hydrobromate and valerianate of morphia may be mentioned, the first one as having been recently introduced into medicine, the last one on account of its superior appearance, as compared with some samples of a dedidedly brown color, met with in the exhibits of two or three other countries. The large, handsome crystals of codeia also deserve special notice, likewise the splendid exhibit in bulk of 700 ounces of sulphate of morphia by Powers & Weightman; the last crystallization of this salt, instead of being broken up in the manner in which it is seen in commerce, has been simply cut up into rectangular bricks which are piled up in one large glass case.

The results of original investigations with opium are met with in the exhibits of T. & H. Smith, of Edinburgh, and of Fr. Jobst; quite a large number of new opium alkaloids have emanated from the latter laboratory, the discoveries of O. Hesse, (see "Amer. Jour. Phar." 1870 p. 394, 1875, p. 447; "Proc. Amer. Phar. Asso," 1873, p. 373); but of the long list *laudania* is the only one exhibited, besides the older alkaloids thebaina, pseudomorphia, and morphia, with some of the salts of the latter ordinarily met with.

A more extensive exhibit of the constituents of opium is made by T. & H. Smith, who besides most of the opium derivatives already mentioned, show bimeconate of morphia, hydrochlorate of narcotina, papaverina as alkaloid and hydrochlorate, narceina, cryptopia, ("Amer. Jour. Phar.," 1867, p. 421), Hesse's rhœagenina (*Ibid.*, p. 123), crystallized meconic acid and thebolactic acid, discovered by the manufacturers (*Ibid.*, 1865, p. 466). The latter nearly colorless liquid is shown in a large glass jar, and the cryptopia in considerable quantity, considering its limited occurrence, in handsome, well-defined crystals as well as in the form of a mass of cauliflower appearance and evidently the result of drying the gelatinous mass which under certain circumstances is formed by the alkaloid and its salts. Several of the opium constituents are presented in the condition in which they have been crystallized in an evaporating dish, the mother liquor having been poured off. Altogether we

regard this as the most interesting and instructive exhibition of the chemistry of opium, on account of the variety of compounds, the number of rare preparations and the results of original investigations.

More limited in the countries of production is *camphor*, which is furnished by the laurel Camphora officinarum, Bauh., a stately tree of Japan and the eastern portion of Asia, where it is obtained by subjecting the cut branches and wood to a crude distillation in the presence of water; after draining it in vessels having a perforated bottom, it is met with in the market as Chinese and Japanese camphor, which varieties are exhibited in their proper departments. The former, or Formosa camphor, is usually of a light-brown or grey color, the latter is nearly white, or somewhat pinkish, and both occur in their crude state in the form of small grains. The refining of the crude article appears to be carried on in Europe still in peculiar-shaped glass flasks, which require to be broken in order to obtain the cake of sublimed camphor. Of late years the refining of camphor has become quite an industry in the United States, where it is effected in vessels constructed for the purpose, having a movable lid, upon which the sublimate condenses; with this arrangement the expense of a glass vessel for each cake is saved.

Crude camphor is exhibited by China and Japan as one of their staple articles, and in the department of the latter country is also found some refined camphor in large fragments, apparently broken from larger cakes. Circular cakes of the refined article, with the accustomed circular hole in the center, are exhibited by Chas. Pfizer & Co., of New York, and Kurlbaum & Co., of Philadelphia, the last-named firm collecting also the volatile oil with which the crude camphor is always more or less impregnated, and which is lost in the old method of purification; like the Formosa oil of camphor with which it is identical, it contains variable quantities of camphor in solution.

Camphor, as is well known, is extensively employed for protecting clothes from the ravages of moths; the crystalline cakes, in which it is usually met with, contain many fissures, from which the volatilization of the camphor proceeds, the same as from the surface. It is obvious, that with a decrease of the entire space presented to the air, the rapidity of evaporation must necessarily be lessened, while its effectiveness must remain the same if, through the slower evaporation, the confined atmosphere may still be kept saturated with camphor. This idea is carried out in the *compressed camphor*, manufactured and exhibited by W. F. Simes & Son. This firm distil crude Japanese camphor slowly from a suitable retort, and carry the vapors into a large chamber, where it condenses in the form of a very fine crystalline powder, which is afterwards compressed by hydraulic pressure into rectangular blocks of a definite weight. These blocks may also be made directly from the crude camphor, and then contain also the small percentage of impurities naturally found therein.

Among the chemical derivatives of camphor we notice crystallized *camphoric acid*, in the interesting and instructive exhibit of H. Trommsdorff, Erfurt, and *monobromated camphor*, by most of the manufacturers of medicinal chemicals of the United States, Germany and some other countries. If we are permitted to judge from the number of exhibitors in the various departments, and from the quantities exhibited, this compound has everywhere rapidly gained the confidence of physicians, and become an

important remedy since it was first recommended by Prof. Deneffe, a few years ago. Although all the samples on exhibition are evidently pure and nicely crystallized, yet, in our opinion, decidedly the handsomest and largest crystals are shown by Hance Bros. & White, Philadelphia, who have on exhibition 38 lbs. of this compound, the result of one crystallization. We are informed that this firm employ essentially the process published in this journal 1872, p. 342, allowing the heat to rise to 270°F. (132°C.) and even 280° F. (138°C.), and that other processes, which were published more recently, did not yield such favorable results. These observations made on a large scale coincide, therefore, with the experiment of F. C. Linthicum (see August number, p. 346). The crop of crystals exhibited by the firm mentioned, was obtained from petroleum benzin.

THE CHEMICAL INDUSTRY OF GERMANY AT THE CENTENNIAL EXHIBITION IN PHILADELPHIA.

BY THE COMMITTEE OF THE ASSOCIATED GERMAN CHEMICAL MANUFACTURERS.

I. *Technical-chemical and Pharmaceutical-chemical Substances and Fertilizing Agents.*

This class comprises the more prominent branches of the chemical major-industry.

Leblanc's *soda* process, in spite of the many not unimportant researches concerning it, has, chemically speaking, experienced no important modification. In the construction of the ovens employed, however, an improvement has been effected,—the principle so much applied in iron technology, of a revolving oven, having here found application. Of the many proposed new methods for the transposition of the salt into soda, only the so-called ammonia-soda process has been able to procure itself an introduction into chemical industry. In spite of all doubt concerning the profitableness of the method, it is a fact that at the present moment the soda so produced can, as excellent 98 per cent. article, compete with the Leblanc soda.

But seldom do statistics reveal to us such a great success and such a profound revolution of an industry as the utilization of the Stassfurt and Leopold Hall waste salts have occasioned in the *potash industry*. Although an offspring of most modern date—hardly ten years old—the decomposition and utilization of these salts have as well as superceded all other methods of producing potash salts.

Corresponding to this colossal production, there are employed in this branch of industry besides 1,100 miners in the two mines, on the average, 3,000 workmen.

In 1872 were produced:

Potassium chloride in various degrees of strength, 80 per cent., 90 per cent., 95 per cent. and 98 per cent., about 132,000,000 lbs.

Potassium sulphate, by double decomposition of potassium chloride and magnesium sulphate, about 2,750,000 lbs.; *Potassium carbonate* (potashes) about the same amount. *Magnesium sulphate*, raw and crystallized, about 22,000,000 lbs. *Sodium sulphate*, crystallized and calcined, about 13,300,000 lbs. *Magnesium chloride*, crystallized and fused, about 11,000,000 lbs. *Boracic acid*, about 26,400 lbs. *Bromine* and *bromine preparations*, about 77,000 lbs. *Artificial bath-salts*, about 220,000 lbs. *Potash manures*, in various grades, about 110,000,000 lbs.

A not inconsiderable part in the increase of the Stassfurt and Leopold Hall industry is taken by the utilization of the potash salts as manures.

About 30 per cent. of the total production of the Stassfurt industry is consumed at home, while about 70 per cent. is exported especially to England, France, Belgium, and the United States, etc.,— a striking proof of the importance of this branch of industry for foreign countries.

While not twenty years ago the entire amount of potashes coming into commerce was made from the ashes of plants containing potash,—whole forests falling martyrs to this mode of production,—we are now indebted to the disclosure of the Stassfurt potash industry for a new and advantageous process of manufacturing the potassium carbonate, so necessary in many branches of industry. This process, as already mentioned, seems qualified to place all other methods in the back-ground, and the more so, as the potashes won from potassium sulphate, and containing 92 per cent. of pure salt, are by far purer than all other potashes which come in the market. Of the 105,600,000 lbs. total produce, 55,000,000 lbs. are made from potassium sulphate.

A considerable part of the hydrochloric acid appearing as by-product in the Leblanc's soda process is used in the preparation of *chlorine*, which, as chloride of lime, is brought to a solid form, or is utilized in the manufacturing of potassium chlorate. While the home production of chloride of lime has not become equal to the English, and considerable amounts are yet imported, the manufacture of chlorate of potash is of equal birth and is not only able to compete with the English product, but has, far more, as well as superseded it.

The utilization of the manganese lyes naturally plays an extraordinarily important rôle in the profitableness of the chlorine products, and it cannot be denied that Germany is somewhat behind other countries in that respect. The Weldon-method used for this purpose (precipitation of neutralized manganese-lyes by lime, and oxidation of the obtained pap by pressing air through it), is very generally extended in England, while in Germany but few manufacturers have adopted it. In a similar manner, although from another point of view, the Deacon process, dispensing entirely with the use of manganite and depending chiefly on the decomposition of copper oxychloride at a high temperature by leading steam, air and hydrochloric acid over it, has, as yet, found no important introduction into Germany.

The *bromine* production at Stassfurt has suffered a sensible injury by the large importation of American bromine into Germany, and can only with difficulty be restored to its former importance.

The chief source of the *ammonia* production, which is worked up as aqueous solution as well as sulphate, carbonate and chloride, is the ammoniacal water of the gas-works. The sulphate has already procured itself an introduction as a manure, while a greater demand for caustic ammonia and the carbonate, occasioned by the influence of many new branches of industry, as for example, the Carré ammonia-soda method of manufacturing ice, is to be predicted.

While formerly only the native sulphur formed the raw material for the production of *sulphuric acid*, to be later superseded by pyrites, we see to-day a whole series of other materials being utilized in the manufacture of sulphuric acid. The great majority of the larger metallurgical works, yielding to the force of circumstances

and, in most cases, to the influence of Boards of Health, have taken up the utilization of the sulphurous acid formerly escaping in enormous quantities into the air. The residues from the Laming-mixture of the gas-works, containing large amounts of sulphur, and the sulphur obtained from the soda residues are also utilized with advantage in the manufacture of sulphuric acid. The ordinary pyrites ovens being utterly inapplicable to the burning of these substances, it has been sought to construct suitable ovens for this purpose, and it is especially in this field that German technologists have introduced important improvements.

The introduction of the Glover-tower, first used in England, into the German sulphuric acid manufacture, marks a further progress. The use of the same allows not only of a greater saving in the employment of nitric acid, but renders it possible to apply the heat of the hot sulphurous acid from the washing-ovens to concentration of the sulphuric acid.

From the remaining chemical-technological products of the major-industry there remain to be mentioned, *nitric acid*, *yellow prussiate of potash*, *alum*, *aluminium sulphate*, *acetic acid* and *oxalic acid*.

The *nitric acid* has found increased application by its use in the manufacture of anilin and alizarin-colors, as well as by the increased production of sulphuric acid, nitro-glycerin, and gun-cotton. Of the salts of this acid, the potassium compound is by far the most important. It is made in Germany almost entirely by decomposition of sodium nitrate with potassium chloride.

The *yellow prussiate of potash*, the starting point of the other cyanogen compounds, finds manifold application as such in the production of blue colors or, in the form of potassium cyanide, in the most various branches of industry. The use of Berlin-blue having become, however, confined, the manufacture of the yellow prussiate of potash, in Germany especially, since animal refuse, owing to the increased demand for manures, has risen in price, has made but little progress. The many attempts to produce the nitrogen of the cyanogen compounds from other than animal sources have as yet not given results of practical value.

The manufacture of *alum* and *aluminium sulphate*, which have an extended application in dyeing, cloth-printing and tawing, as well as in paper-making, has remained as well as unchanged, except that ammonia has been substituted in the alum in place of the potash.

Oxalic acid, which a few years ago was almost entirely an English monopoly, has lately become the object of an extended manufacture in Germany. The oxalic acid produced in Germany leaves nothing to be desired as regards its quality, and can confidently compete with the English product.

The oxidation of alcohol on the one side and the distillation of wood on the other, remain the methods for the wholesale manufacture of *acetic acid* and the many salts of it, finding application in technology.

For the production of *lead acetate*, the acetic acid from alcohol is used almost exclusively, as the latter, when intended for this branch of industry, enjoys indemnity from duty, and hence, without difficulty, can compete with the pyroligneous acid. It is different, however, with the other acetic acid preparations, in whose production the alcohol employed is not free from duty. The present unusually low price of alcohol alone renders it possible to maintain a competition with the acetic acid products made from pyroligneous acid.

The large portion of *pyroligneous acid* is indebted to the very important extension of the industries connected with the distillation of wood. The large consumption of methyl-alcohol by the anilin-color works, and the constantly increasing demands for acetic acid and its salts by the technical industries have occasioned the utilization of the relatively large forests of Germany to appear all at once so very profitable in this respect that such works have sprung up like mushrooms. On account of the decrease in anilin-color production, the demand causing an excessive production has weakened, so that this branch of industry at the present moment suffers severely. This is shown especially in the case of acetic acid by its unprecedented fall in price.

We may calculate the production of 100 per cent. methyl-alcohol in the years 1872 and 1873 as at least 1,320,000 to 1,540,000 lbs. per year corresponding to about 5,280,000 lbs. of 100 per cent. pyroligneous acid; certainly a large quantity, and which, in conjunction with the acetic acid produced from alcohol, far exceeds the demands of Germany.

Apart from the productions of the proper chemical major-industry, lies the manufacture of a great number of *pharmaceutical-technological* and *scientific chemical substances*, which we cannot properly pass by in silence, since it is especially this manufacture which has been brought to a high degree of perfection in Germany. This agrees particularly with the considerations already introduced at the beginning, that the high perfection which the study of chemistry in general has attained in Germany has made this branch of industry, demanding relatively the largest amount of chemical knowledge, capable of competing with any of the foreign manufactures.

Concerning the extent of their production, the amount is far outweighed by the value of the products, so that a not inconsiderable number of them, as respects their sale, may be classed among the products of the chemical major-industry. From the field of inorganic chemistry, we shall only refer to those of the great number of acids and salts which are used in pharmacy.

The dyeing, printing, galvano-plastic, and pyrotechnical establishments, in short a large number of technological industries, make the discoveries of science useful to their purposes, and even of the rare metals but few can be named which as such, or as some of their compounds, find no application in technology. To see their way in this enormous labyrinth, to have a knowledge of the wants of the day, to keep an open eye and ear for every novelty, is the task of these establishments. Owing to the daily increasing material, divisions have taken place within the chemical minor-industry. The organic has not only separated itself from the inorganic, but is itself split asunder in all directions.

In regard to the field of organic chemistry, the front place is held by manufactories producing *alkaloids*. The difficulty of overlooking the drug-market, combined with the extraordinary variations in price, according to the results of the harvest of many drugs, as opium, cinchona, etc., make a careful observance of the market a necessary condition, and hence it was in this department that a division of labor was first perfected.

We find in Germany a whole series of manufactories occupied exclusively with the production of alkaloids. Unfortunately the statistical material at our disposal

is unserviceable in judging of the value and extent of the total production, so that we must confine ourselves to referring to this deficiency.

The manufacture of *alcohol preparations*, more particularly of ether, acetic ether and absolute alcohol, is confined to a few of the larger manufactories, since the difficulties of transportation of these liquids, and furthermore the burdens of duty, render an extended export impossible. From its great production of alcohol, hardly any other country can compare with Germany in the production of these articles.

Indirectly connected with these preparations are fruit-ethers, chloroform, chloral-hydrate, tannin, pyrogallic acid, iodoform, etc., with which products Germany supplies Russia, France, England and the United States.

The consumption of *chloral-hydrate*, which promised to become an article produced on a large scale, does not appear to increase. The export of the substance is, however, considerable.

Potassium iodide and *bromide*, although their manufacture in foreign countries is not inconsiderable, may be mentioned as export articles.

A specifically German industry is the production for science of important and interesting *chemical preparations*, particularly in the domain of *organic chemistry*. The Exhibition gives an agreeable picture of the progress in this field. Even although the pecuniary results, owing to the small demand, can be but small, yet they are well calculated to obtain in foreign lands a good name for German knowledge and wealth. The bond of sympathy which unites these establishments with science and its followers bears the latest chemical acquisitions to the remotest regions, and gives the proper guidance to their technical utilization.

Salicylic acid and its derivatives, and *vanillin* are striking examples of the above. The first, an ordinary organic acid extracted from the gaultheria oil (winter-green), attracted no attention so long as its price corresponded to the expensiveness of the raw material. Since a convenient method of preparation from Phenol has been invented, however, it has become the object of a lively manufacture, and its applications increase with the ease of its production.

Artificial *vanillin* which hardly a year ago first became known in chemical circles, is now in great demand as a substitute for the natural vanilla. While until then, we obtained the vanilla aroma from tropical countries, we are now able to produce it in any quantity from the pine forests.

In the manufacture of essential oils, also, the endeavor is made to emancipate ourselves more and more from the silent operations of the plant, and to utilize materials more conveniently to be obtained. As examples, may be mentioned the gaultheria-oil, the bitter-almond-oil, the mustard-oil and the latest of all, the oil of the Spiræa Ulmaria, the Salicylic Aldehyd. Owing to the cost of the materials for research, it is but natural that advance in this path is somewhat restrained, but it is not to be doubted that eventually a large part of the essential oils will be produced by Synthesis.

ALIZARIN.

BY CARL RUMPFF.

After all the lighter oils used for manufacturing anilin colors are separated from coal-tar by distillation, by successive heating up to about 170°C., the temperature of

the still is raised to 210°C., and thereby the important *anthracen* is obtained, a body which, in a state of purity, is a hydrocarbon, has the chemical formula $C_{14}H_{10}$, and furnishes the raw material for the preparation of alizarin. According to the quality of the coal used for the manufacture of illuminating gas, the tar contains from 1 to 2 per cent. of pure anthracene.

The important invention of making it serviceable for the production of alizarin, resulted by accidental circumstances.

In 1868, Messrs. Graebe & Liebermann, of Germany, experimented with alizarin ($C_{14}H_8O_4$), contained in, and centuries since extracted from madder, with the view of finding improvements for its use in printing on cotton, when they obtained a compound having the chemical composition represented by $C_{14}H_{10}$. Finding this to be also the corrected formula of anthracene from coal-tar, they promptly went farther on with the right inspiration—that if alizarin from madder could be traced back to anthracene, it wanted only a practical way for introducing four atoms of oxygen into, and withdrawing two atoms of hydrogen from, the coal-tar anthracene, to make it alizarin.

This correct idea was their invention. But as is often the case with such important revolutions, brought about by chemical genius, they had only broken the ice without opening the river for navigation. The processes they had adopted turned out to be impractical for cheap production in larger quantities, and only after experimenting for several years more practical processes have been found by us and others, which opened the way for the immense production it has reached already, and affect very materially the cultivation of madder.

The crude distillate is brought into the market in a concentration of generally 25 to 30 per cent. of pure anthracene. It is a doughy, pasty mass, which, besides anthracene, contains also lubricating oils of high boiling points. In order to prepare this crude anthracene for use at the factory, or, to make it more plain, to free it from a part of the homologous admixtures which hinder the subsequent process of oxidation, it is, after previous heating, freed first from part of its oils by hydraulic pressure, and then shows 40 to 50 per cent. of pure anthracene.

Through further treatment, either by means of solvents—for instance, naphtha, petroleum ether, etc.—or by sublimation, it is more purified, so as to contain from 68 to 90 per cent. $C_{14}H_{10}$. For special purposes it is prepared in a more perfect state by crystallization with 95 per cent. $C_{14}H_{10}$, or even chemically pure, which, by sublimation, gives beautiful crystals.

In order to produce alizarin as the ultimate product from anthracene, different methods may be adopted, either by forming *bichlor-anthracene* $C_{14}H_8Cl_2$, or, *bibrom-anthracene* $C_{14}H_8Br_2$, or by oxidizing anthracene with the assistance of bichromate of potassa and sulphuric acid into *anthraquinone*, which, when chemically pure, has the formula $C_{14}H_8O_2$, and crystallizes in beautiful needles.

It is, of course, impossible for us to specify the many different methods by which the point aimed at, viz., alizarin, can be, and is, reached; but we give the following way, tested in practice, which renders it possible to obtain a clear insight into the successive development of the end product.

Both bichloranthracene and bibromanthracene, as well as anthracene chlorinated by special processes, and also the anthraquinone form when heated with anhydrous

oil of vitriol a sulpho-acid (a crude anthraquinone product practically workable), which, according to its subsequent purification or treatment, furnishes a material—*sulphanthraquinonic acid*—for the production of alizarin, dyeing with scarlet or blueish tints.

If the sodium salt of sulphanthraquinonic acid, together with caustic soda, is heated up to a high temperature, the *alizarate of sodium*, $C_{14}H_6Na_2O_4$, is formed as a crude fused mass, fit for farther factory purposes. On decomposing this salt by an acid, the *alizarin* $C_{14}H_8O_4$ is obtained, which, carefully purified, comes into the trade as a paste of 10, 11, 15 or 20 per cent. concentration.

The preparation and use in this watery state has hitherto proved to be the most advantageous and practical form of alizarin, as, if it is furnished in a dry state, a perfectly equal solution and distribution afterwards in the dyeing bath or in the thickening for printing, would be found very difficult.

In this respect, also, is shown the essential difference of character between the alizarin colors and the anilin colors, which latter in dyeing form only a precipitate on the fibre, and are therefore not fast, especially when exposed to the influence of the light, whereas alizarin is a fast color, because it is an acid which, in combination with other mordants, by a process of oxidation similar as is the case with indigo, develops the red, violet, orange, black or brown tints in the fibre, thereby producing it fast against light and even the strongest fulling.

Alizarin crystallizes and sublimes in red needles. By a double decomposition of a solution of alizarate of potassium, or alizarate of sodium and soluble metallic salts, the corresponding difficulty, soluble alizarates, are obtained.

The most interesting, wonderful fact which will strike our minds with surprise while investigating the above processes, is that in coal all that remains from the trees and vegetation of gigantic antediluvian forests should have been discovered a raw material, and from it a color of exactly the same chemical identity and composition as that which so far was extracted only from the root of the insignificant plant Rubia tinctorum, generally known as madder. After such success, it is quite natural that efforts have been made to go still a step farther in this direction, and that we, as well as many others, hammer already for a considerable time at the solution of another immense problem, viz., the artificial production of real indigo.

VARIETIES.

THE ANTISEPTIC ACTIONS OF SALICYLIC AND BENZOIC ACIDS ON BEER-WORTS AND URINE. By E. von Meyer and H. Kolbe.—A reply to certain statements of Fleck in opposition to the views enumerated by the authors of this paper. They find that salicylic acid acts differently upon yeast when added to worts when the yeast and acid are added to glucose solutions. Whilst ·5 gram salicylic acid in 1,000 cc. sugar-solution checks the action of 15 grams of beer-yeast, the same quantity of the acid when added to 1,000 cc. of wort has no apparent influence upon 10 grams of yeast; but ·5 gram benzoic acid stops the action of 1 gram of preserved yeast, whilst the action of this is not checked by ·5 gram salicylic acid.

The key to the explanation of this was found in the fact that salicylic acid dis-

solves more readily in worts than in a simple solution of glucose; and it was found that ether does not extract the whole of the acid when shaken with the former solution until after acidification with hydrochloric acid. Further experiments showed that a molecule of disodio-hydric phosphate fixes two thirds of a molecule of salicylic acid, whilst one molecule of the same salt is capable of fixing only half a molecule of benzoic acid. Since it is only the free acid which exercises an antiseptic or anti-fermentative influence, and beer worts contain phosphates, the differences in the behavior of salicylic and benzoic acids respectively to worts receives a ready explanation.

As might be expected from the richness of urine in phosphates, a larger quantity of both acids is required to check putrefactive changes in urine than to prevent the fermentation of saccharine solutions and worts. In both cases ·5 per 1,000 of free acid was about the quantity necessary to effect the object in view.

It is obvious that when antiseptic uses are in view, salicylic acid should not be employed dissolved in solutions of sodium phosphate, borax, or other alkaline medium.—*Jour. Chem. Soc.* [Lond.], June, 1876, from *J. Prakt. Chem.* [2], xii, 178—203.

AN ALKALOID OCCURRING IN THE BRAIN AND THE LIVER, AND IN THE WILD POPPY. By F. Selmi.—In examining the brain or liver for poisonous alkaloids, if after treatment with ether, it is extracted with amylic alcohol to ascertain if morphia is present, and the solution is evaporated, a yellowish residue is obtained partially soluble in dilute acetic acid. On adding a drop of iodized hydriodic acid to this solution after it has been concentrated at a gentle heat, and *immediately* examining it under the microscope (650 diameters), brown crystalline plates will be observed, sometimes solitary, sometimes united to form a cross, and rapidly disappearing, being transformed into brown oily drops. The same phenomena are observed even when the acetic solution has been evaporated to dryness and heated for some time to 120°, if the residue is again dissolved in water and tested with the iodized hydriodic acid. As these crystals closely resemble those produced with morphia by the action of the same reagent, it is always necessary in toxicological researches to apply the iodic acid test. On agitating the amylic extract with water several times, the alkaloid is dissolved out, yielding an alkaline solution, which after being acidulated with acetic acid, gives the above-mentioned reaction even more definitely. The quantity contained in the brain and liver is, however, very small.

When examining the green heads of the wild poppy for morphia, by exhausting them with alcohol, mixing the extract with baryta, and finally treating it first with ether and then with amylic alcohol, the author observed that the amylic solution behaved in a manner precisely similar to that obtained from the brain and liver; the acidified aqueous extract giving fugitive crystals identical in form and color with those previously mentioned: no morphia, however, could be detected, neither did the dried capsules contain any alkaloid giving these reactions. On keeping the alkaline solution obtained by agitating the amylic extract with water, it lost its alkaline reaction after a week and no longer gave the same kind of crystals with the iodized hydriodic acid. The solution, saturated with acetic acid, may, on the contrary, be preserved unaltered if mixed with an equal volume of alcohol. The author gives a list of the reactions of this alkaloid with 13 different reagents, which reactions are identical, whether it has been prepared from green poppy heads or from the alcoholic extract of the brain. This should be made with absolute alcohol, then precipitated by basic acetate of lead, filtered, and mixed with ether; this produces a second precipitate which is to be removed, and the clear solution evaporated after the lead has been separated by means of ammonium sulphide. The second lead precipitate produced by the ether, when decomposed in a similar manner, yields a substance differing from the new alkaloid, in that it does not give any precipitate either with the iodide of potassium and cadmium, or with Mayer's reagent.—*Ibid.*, from *Gazzetta Chimica Italiana*, v, 398—402.

SELF-PRESERVATION OF GRAPES IN SPIRIT. THE CONSEQUENCE OF THE MANNER OF EXISTENCE OF CELLS OUT OF CONTACT WITH THE AIR. By G. Missaghi.—The author found that some grapes which had been left for a considerable time (eight months) in an atmosphere of carbonic anhydrid confined over mercury did not decompose, but that acetic acid, formic acid, and alcohol were produced, a small cavity which was formed where the stalk is inserted into the fruit being filled with the liquid. The rest of the grapes remained in the normal condition, but their flavor was similar to that of fruit which had been kept for a long time in strong alcohol.—*Ibid.*, from *ibid.*, v, 421—422.

DETERMINATION OF SULPHURIC ACID AND SOLUBLE SULPHATES BY MEANS OF STANDARD SOLUTIONS. By M. H. Pellet.—The author first precipitates the sulphuric acid by chloride of barium in excess, precipitates the excess of chloride of barium with yellow chromate of potash, and finally determines the chromate with standard solutions of protochloride of iron and permanganate of potash.—*Chem. News*, July 7th.

NEW PROCESS FOR THE MANUFACTURE OF DEXTRIN. By M. Anthon (*Dingl. Pol. Journ.*)—At present fecula in the separate state is exclusively employed in the preparation of dextrin, all that portion being wasted which is retained by the fibrous part of the potato or of the bran. To prevent this loss the author recommends the use of the entire potato dried and ground after being freed from its soluble principles by washing in acidulated or alkaline water. The fecula thus obtained is sprinkled with hydrofluosilicic acid (0·5 to 1 per cent. of the weight of the fecula); it is then placed in a drying-room at 38° to 44°C. till there is no further loss of weight; the temperature is then raised to 70° to 75° till no loss occurs, and finally to 90°. The desiccation being thus complete the fecula, whilst still hot, is placed in large flat sheet-iron troughs which are introduced into large stoves heated to 100° to 125°. The transformation into dextrin is known to be complete when a sample taken out, on being cooled and moistened with cold water, adheres together in little glassy globules.—*Chem. News*, June 23, 1876.

MINUTES OF THE PHARMACEUTICAL MEETING.

A pharmaceutical meeting was held August 15th, 1876, Edward Gaillard in the chair. The minutes of the previous meeting were read and corrected so as to read, "a stone jar in which balsam of *Peru* was imported, was presented by Cramer & Small."

Prof. Maisch presented, from J. W. Lloyd, a specimen of willow—Salix Muhlenbergiana, a large amount of which was attempted recently to be thrown upon the market as epilobium augustifolium; the fraud was happily discovered before it reached the hands of persons unacquainted with the herb. A herbarium specimen of epilobium was exhibited for comparison, and attention called to Gray's description of this species of willow as S. humilis.

Prof. Maisch read a paper entitled Notes on the Genus Teucrium; also one on Fucus Vesiculosus and other allied species (see pages 392 and 395) and dried specimens and colored illustrations of the plants described in the two papers were shown to the members.

Prof. Remington exhibited Hill's Consecutive Numbering Machine, and illustrated its method of working He had examined several appliances of this kind with the view of numbering prescriptions so as to avoid duplications, and believed this one to possess some advantages over others. It can be started at any

number, and if desired, will make duplicates; the one exhibited will number from 1 to 99,999, and its price is $25.

Dr. Pile said that recently, while preparing diluted phosphoric acid by Markoe's modified process, during the evaporation the attendant allowed the temperature to rise to 600°F. After making it of the proper strength, it was tested with ferric chloride, which produced a gelatinous precipitate, from which he inferred it had turned to the variety which produced this precipitate After a few days it was again tested, but no precipitate was formed. Thinking that if the diluted acid was prepared from the glacial acid, that by waiting some time the same facts might be observed, made the experiment and found the precipitate formed would re-dissolve upon standing, but would always be produced.

The meeting adjourned to meet October 17th, 1876.

WILLIAM MCINTYRE, *Registrar.*

EDITORIAL DEPARTMENT.

THE next meeting of the American Pharmaceutical Association promises to be the largest one ever held. From information received from various parts of the country, it seems that many of the members have postponed their visit to the Centennial Exposition to the beginning of September, when the temperature may be expected to be more agreeable than during the unusually hot summer which is now near its close, and when the prospect of meeting so many friends from all parts of this continent will hold out additional inducements to pay a visit to the city where the International Exposition is being held this year. It is to be hoped that the members, who have accepted queries for investigation, will have prepared their reports in due time, and that those who may know of new or interesting subjects will bring them forward, either in the shape of a report or as a matter for discussion. Members attending the meeting may know beforehand many of the subjects which are likely to elicit discussion before the association, by consulting the list of queries which have been accepted for research, and each one may in this way contribute towards increasing the interest of the meeting.

While under such conditions a few days will undoubtedly be profitably spent, the many useful and interesting articles which have been sent to Fairmount Park, from all parts of the globe, will claim the attention of all to a greater or less extent, and it is these varying interests which require to be harmonized, so that the visitors may be enabled to derive the greatest possible benefit from their attendance. This subject in particular has claimed the serious attention of the joint committees engaged in making preparations for their visiting brethren, and it is believed that the plan which they will submit to the association will meet the approval of the members, as it will most likely harmonize the various interests and enable all to derive the greatest possible benefit from their visit.

The necessary accommodations have been another subject of concern for the committee, since in September various national conventions and meetings of societies will doubtless bring a large number of strangers to this city. This matter has also been satisfactorily arranged, and if members will notify the permanent secretary in due time, there will be no difficulty to provide suitable accommodations for all within a convenient distance of the place of meeting.

And the visiting ladies? We are sure that during their stay here they will not lack any attention; and that the twenty-fourth meeting of the association will form another link in those pleasant recollections which bridge over the time from one meeting to another, and make all participants look forward with unalloyed pleasure towards the next one.